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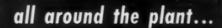
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Annual Statistical Summary

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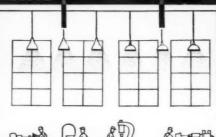
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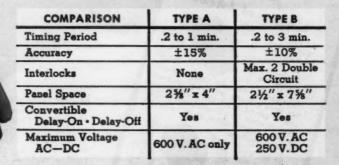
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Electrical Construction and Maintenance

Published for electrical contractors, electrical departments in industry, engineers, consultants, inspectors and motor shops. Covering engineering, installation, repair, maintenance and management, in the field of electrical construction and maintenance.

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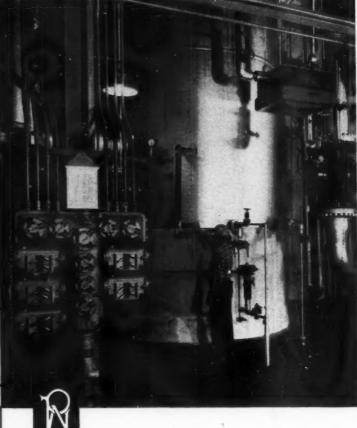
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1958 continued SEPTEMBER

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Vol. 57, No. 9

R. H. Powell, Atlanta

ELECTRICAL CONSTRUCTION and MAINTENANCE

September 1958

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STATISTICAL SUMMARY

Our annual statistical summary which appears this month, beginning on page 65, again sums up a selection of the figures on the general economy, the construction industry and the electrical industry which have a bearing on the trends and the outlook for electrical construction activity. During the weeks in which the data was assembled there have been many indications of a return to up-trending curves in the general economic scene which, together with the excellent showing of the construction industry through the recession period, gives every indication of lively business prospects in the coming months for our growing industry.

NEW ILLUMINATION RECOMMENDATIONS COMING

Following study of the Blackwell research data (Electrical Construction and Maintenance, April, page 55 and June, page 86) the committees of the Illuminating Engineering Society responsible for lighting application recommendations in their various fields have been reviewing past minimum standards and developing new recommendations reflecting practical interpretation of the new research findings. Preliminary data on the footcandle value to be recommended for specific areas of lighting application are currently being distributed to the members of IES for discussion. We shall publish these new recommendations for your information as rapidly as they are released to us by IES for industry guidance.

TOOLS FOR LIGHTING MAINTENANCE

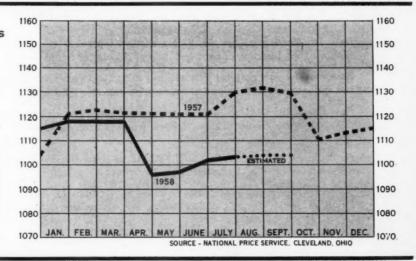
Contract maintenance of fluorescent lighting installations is a rapidly growing service business which has inspired the development of specialized methods for the speedy and efficient care of lighting equipment on the customer's premises. Fluorescent Service Corporation of Tampa, Fla., keeps its contract rates low and customer satisfaction high by employing specially designed equipment. Typical devices are a new washing machine for trans-lighted ceilings and efficient, labor saving truck body layouts. They are described in "Special Lighting Maintenance Tools" beginning on page 88.

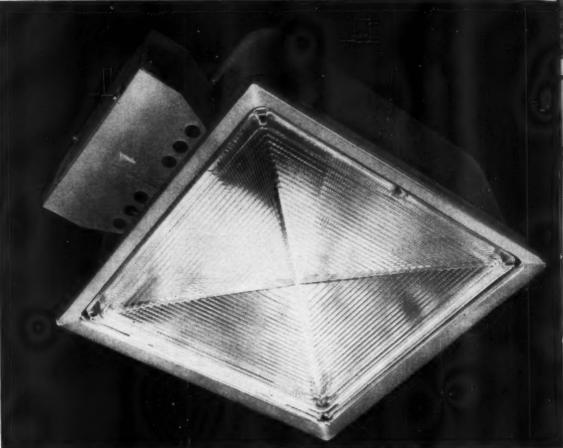
SHOPPING CENTER POWER

In New Jersey's huge Garden State Plaza development, a shopping center at Paramus, two high voltage distribution systems are provided to serve 1) the owners power and light loads including the largest department store and 2) the tenant stores throughout the center. Details of the installation made by Watson Flagg Engineering Corp. of Paterson, N. J. are described in "High Voltage in a Shopping Center" beginning on page 80. Earlier work involving supply for the extensive parking areas of the project were described in "Power For Parking Lights" in the September 1957 issue.

ELECTRICAL MATERIALS COST INDEX

BASE LINE (1000) REPRESENTS COSTS OF TYPICAL ASSORTMENT OF MATERIALS FOR A SELECTED JOB. AS OF NOVEMBER 1, 1951. INDEX POINTS REPRESENT THE VARIATION OF THESE SAME MATERIAL COSTS AS OF THE FIRST OF EACH MONTH.





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UNI-FRAME

fits every lens box application...beautifully!

New THINcandescent design! Single, narrow, tapered frame fits flush with plaster or acoustical tile for happy blending of light and ceiling. No plaster frame needed.

New modular light pattern! Prismatically-accurate Pyrex* lens is largest available for 12" lens box. Equalizes light distribution over square area. No light leaks.

New flexibility! One box size, in two look-alike series, accommodates any medium-base lamp (100-300 watts). Choice of three finishes: white enamel, aluminum or brass.

For additional information about UNI-FRAME, call your Day-Brite representative listed in the Yellow Pages. Or write...

Day-Brite Lighting, Inc., 6248 N. Broadway, St. Louis 15, Mo. Day-Brite Lighting, Inc., of Calif., 530 Martin Ave., Santa Clara, Calif.



^{*}Registered trade name of Corning Glass Works

SEAMLESS RECESSED BOX



ENGINEERING

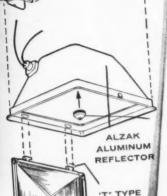
NEWS LETTER

AGAINST ANY OTHER LENS BOX...

- $\sqrt{\text{Design of box permits plastering in}}$ without plaster frame.
- √A modular lens box...replaces 12" acoustical ceiling tile.
- $\sqrt{
 m Reversible}$ knurled nut and adjustable mounting brackets provide complete installation flexibility.
- $\sqrt{\, ext{Pre-wired!}\, ext{Removable}}$ wiring box can be installed through inside or outside of box.
- $\sqrt{\mbox{ No light leaks!}}$ Lens is set like a jewel in hidden inner frame, held by stainless steel clips.
- $\sqrt{ ext{Snap-type latch}}$ and separable hinges speed installation and maintenance.
- $\sqrt{ ext{Check the price advantage when you standardize}}$ on UNI-FRAME. One box size does itthroughout the job.

CHECK THESE UNI-FRAME FEATURES





HINGES

PYREX GLASS LENS

PENDING

<u>y!</u>

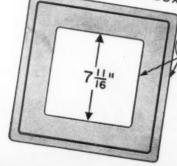
LUMINOUS AREA MORE THAN DOUBLED!

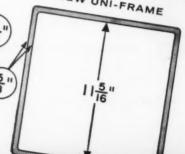
UNIQUE, NEW FRAME IS LESS THAN ONE-THIRD THE WIDTH OF FRAME ON OLD STYLE LENS BOX. SIZE OF LENS IS INCREASED FROM 59 TO 128 SQUARE INCHES! OLD STYLE LENS BOX

NEW UNI-FRAME

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GARFIELD, NEW JERSEY

Washington Report

SEPTEMBER • 1958

Inflation has replaced the recession as the nation's major economic problem, as the national economy levels out and heads upward again. President Eisenhower, in citing the need to curb inflation now, has urged both business and labor to cooperate in keeping prices down, and has asked Congress for tighter curbs on Federal spending. Wage increases and prospects of heavy Government deficits for years ahead are big factors contributing to continued inflation, the President has warned.

Big shifts are in the making for the 1959 fiscal budget: spending will be up sharply—near \$79 billion, compared with last January's estimate of \$74 billion; revenues will be down—about \$67 billion rather than \$74.4 billion previously estimated; deficit will be deep—near \$12 billion, rather than \$400 million surplus anticipated last January. While the summer step-up in defense and public works spending (anti-recession measures) can't be stopped quickly, some cutbacks in spending plans this fall and winter are already becoming evident.

Electric power output set new weekly records last month, as hot weather spurred the use of fans and room coolers. Weekly kwhr production ranged upward to 12,851 million, up some 3.6% ahead of the similar period a year earlier.

July construction expenditures hit a new high for the month of \$4.6 billion, up more than \$200 million from June, and \$100 million over July of last year.

Congress voted down the \$2 billion local public works program proposed by the Democrats as an anti-recession plan, during the closing

days of its last session.

Capital spending for highways is expected to reach a record \$6.2 billion this year, up 10% from 1957, according to recent estimate by Dept. of Commerce. Also predicted was a further rise to \$7.1 billion next year, \$7.7 billion by 1961, and \$8.1 billion by 1962. Spending for toll highways is expected to decline over the same period.

A bill authoriing spending of \$386.7 million for atomic construction

projects has been approved by President Eisenhower.

The total military construction budget for fiscal 1959 is \$1.7 billion, of which more than \$1 billion is earmarked for missile bases.

Private housing starts in July, hit a 2½-year high, when 107,300 private, and 3,700 public starts were made, for a seasonally-adjusted annual rate of 1,160,000, highest since January 1956. A total of 605,200 private homes were started during the first seven months, up 26,000 over similar 1957 period.

Business recovery started during second quarter this year, when gross national product was at annual rate of \$429 billion, up \$4 billion from first quarter rate, Dept. of Commerce revised estimate shows. Other economic highlights: Industrial production climbed to 133 (FRB adjusted index) in July, up from 131 in June, 128 in May, 126 in April; Personal income in July hit an annual pace of \$354.5 billion, a new high for any month; Unemployment dropped to 5.3 million in July from 5.4 million in June; Employment rose to 65.2 million in July, up 200,000 from June; Wholesale prices (BLS) Index) remained at 119.2, same as for June; Cost-of-living index rose to a new high of 123.9 in July, compared with 123.7 in June, and 120.8 in July 1957.

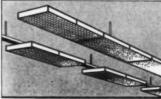
NEW GIBSON ORTHO-66

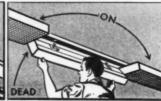


unequalled for flexibility and ease of maintenance

OR INTERVAL MOUNTING

The Ortho may be mounted in continuous rows or at intervals of 4, 8, 12 or more feet. Fixtures can be added, removed or re-spaced at any time by one man without tools.





REMOVAL OF FIXTURE WON'T INTERRUPT OTHERS

Any fixture may be removed for cleaning or repairs at any time withou. interrupting the other fixture in the row. When a fixture is unlatched, it disconnects itself.



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another fine fixture that plugs in on the exclusive Gibson Uni-race

4 SIMPLE STEPS that save over 75% on installation labor costs

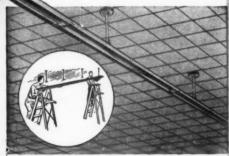
Because the Ortho fixture eliminates so many of the time-taking operations common to conventional installations, it easily saves more than 75% in labor. Contractors report that all labor, including stems and lamping, averages only 17 to 22 man minutes per fixture, as compared with the NECA standard of over 2 man hours for conventional fixtures.



Assemble the Uni-Race • The exclusive Gibson Raceway, known as the Uni-Race, can be assembled on the floor in lengths up to 200 feet. The four or eight-foot sections are joined by telescoping couplers which provide a smooth, rigid union of the sections and are fastened with self-tapping screws.



2 Wire the Uni-Race • Branch-circuit wires are laid in the Uni-Race and connection is made at each built-in receptacle. The receptacles will later receive the plug that is built into each fixture. The Uni-Race, U. L. approved as a raceway, has a capacity of five No. 8 AWG wires or eleven No. 14 wires.



oved any the hen

> Hang the Uni-Race • The rigid Uni-Race is easily lifted and hung in any of several diferent ways. Lengths up to 200' can be hung as a unit if supported every 24' while being raised to mounting position. When the branch-circuit connection is made, the Uni-Race is ready for the fixtures.



4 "Plug In" the Fixtures • The fixtures are merely "plugged in" on the Uni-Race, Hooks on the fixture engage in slots on one side of the Uni-Race, acting as hinges. The fixture is swung closed and latched. The built-in plug on the fixture automatically connects with the receptacle in the Uni-Race.

UNI-RACE NOW U. L.-APPROVED AS A 225-AMP RACEWAY • The Gibson Uni-Race is now U. L.-approved as a raceway with capacity for five No. 8 AWG wires or eleven No. 14 AWG wires. It will house the circuitry for a 200-foot continuous run of two-light fixtures (either 40 or 75 w.) or a 100-foot run of 4-light fixtures.

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EC&M "VL" Controllers are compact and have vertical-action type contactors. The well-known EC&M

rtical-action type contactors. The well-known EC&M control previous *NEMA Service Classification II applications

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A companion line to EC&M's "PT" Control for DC cranes, this new "VL" control is far superior to manual control previously specified purely on the basis of price.

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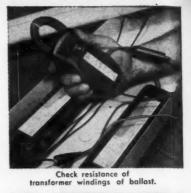
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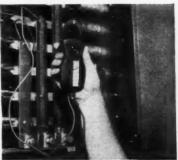
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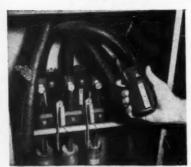
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ELECTRICAL CONSTRUCTION AND MAINTENANCE . . . SEPTEMBER, 1958

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DESCENT

SPECIAL TONS

144 | 184 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 1

FLUORESCENT RLM SPECIFICATIONS

8-15% UPLIGHT 20-30% UPLIGH 0-1 D-1 D-2 D-2 D-2 D-3 SD-1 SD-1 SD-

This label identifies the RLM- certified lighting equipment of 27 leading manufacturers.

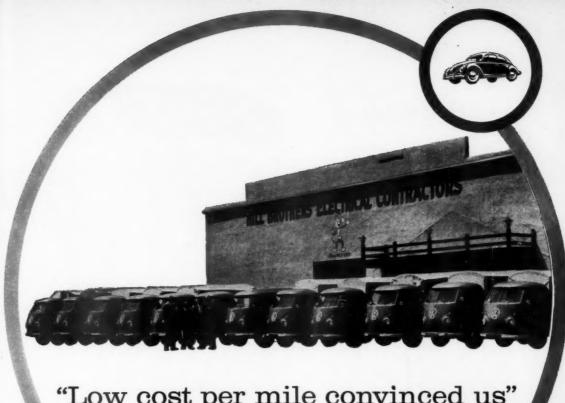
3						ABOUTE LIGHTING DIV.										
3	5	3		1		APPLETON ELECTRIC CO.										
3	4	4		1		BENJAMIN ELECTRIC MFG. CO.	1	4	1	1	4	4	1	1	1	4
						DAY-BRITE LIGHTING, INC.	1	1	1	1	1	1	1	1	1	1
						EASTERN FIXTURE CO., INC.	1	1		1						
4	4					ELECTRO LIGHTING CORP.	1	1					1	1		
						ENDER-MONARCH CORP.	1	1		4						
						FLUORESCENT FIXTURES OF CALIFORNIA	1	1	4	1	4	4		4	1	
						GLOSE LIGHTING PRODUCTS, INC.	1	1		1	4				1	
						THE EDWIN F. GUTH CO.	1									
						KEYSTONE ELECTRIC MFG. CO.	1	4		1	1					
						LIGHTING DYNAMICS, INC.	1	1		1	4			1	4	
4			2			THE MILLER CO.	1	1	4	1	4		1	1	1	1
						MITCHELL LIGHTING DIV.		1		1	1					
4			2		1	MULTI ELECTRIC MFG., INC.	1									
4	3	3				OVERBAGH & AYRES MFG. CO.										
5	3	5		2		QUADRANGLE MFG. CO.										
						RUBY-PHILITE CORP.	1	1	1	1	1			1	1	1
						SMITHCRAFT LIGHTING DIV.	1	1		1	4					
5	3	3				SMOOT-HOLMAN CO.	1	1	1	1	4	1		1	4	1
4	1		1		1	THE SPERO ELECTRIC CO.										
4		2				THE STEBER MFG. CO.										
						SUNBEAM LIGHTING CO.	1	1	4	1	1	4		1	1	1
						SYLVANIA ELECTRIC PRODUCTS, INC.	1	1	4	1	1		1	1	4	1
5	4	2		2		WESTINGHOUSE ELECTRIC CORP.	1	1		1	1			1	1	1
3	4	2				WHEELER REFLECTOR CO.	1	1	1	1	1		1	1	1	
						WORK-O-LITE CO.	1	1		1	1					

RLM ADDS NEW SPECIFICATIONS FOR SPECIAL SERVICE FLUORESCENTS.....REVISED SPECS COVER UNITS FOR 800 mg. LAMPS.....BROADENED INCANDESCENT STANDARDS FOR REFLECTOR SIZES AND TYPES OF LAMPS.....EVERY RLM SPEC STRENGTHENED, MADE MORE IMPORTANT, REVISED UP I

These are some of the reasons why the leading manufacturers listed above are especially proud today, to bring you units bearing the RLM Label. They know that, by keeping pace with latest industrial lighting advancements, RLM now stands for more lighting quality than ever.



Send for Free 1958 RLM Specifications Book. Write: RLM Standards Institute, Suite 8199, 326 W. Madison St., Chicago 6, III.



"Low cost per mile convinced us"

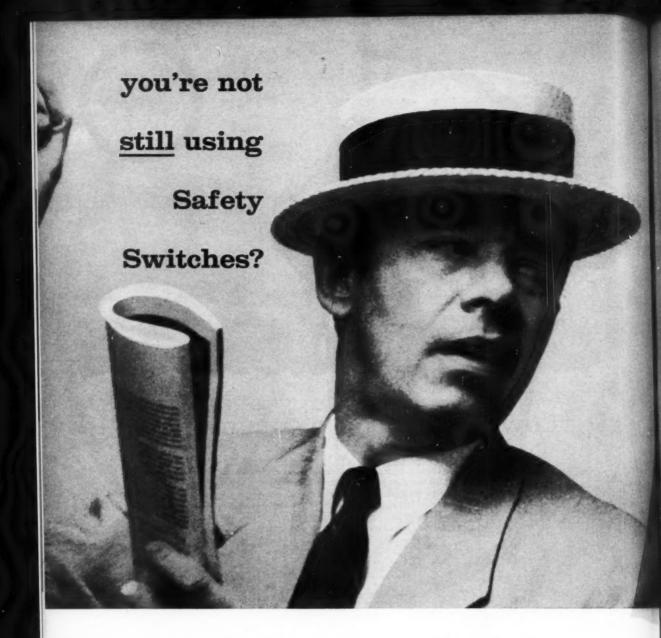
Virgil Hill, Hill Brothers Electrical Contractors, Sacramento, Calif.

"We have operated two Volkswagens for the past year and the low cost per mile operating expenses of these vehicles convinced us that we should complete our fleet with ten more of the same economical Volkswagens. Our savings were not only in gasoline, but we enjoyed a reduced cost of tires and maintenance."

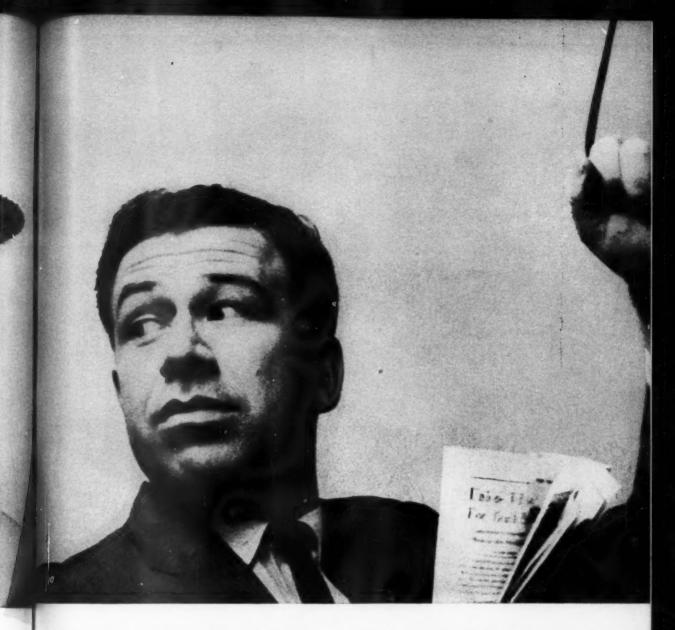
Low cost per mile and low maintenance are important reasons why Volkswagen Trucks are so popular. The engineered dependability of every Volkswagen is backed up by the world-famous service in all 49 states. When service is needed, every www owner gets the best. The investment in a Volkswagen Truck pays dividends. Real savings mile by mile add up year by year. Ask your authorized dealer to show you the operating cost records for a Pick-up Truck, Panel Delivery, or Kombi Station Wagon. A Volkswagen costs less to buy, run, and maintain.

VOLKSWAGEN DELIVERS THE GOODS...FOR LESS!





here are the <u>facts</u> on AB-I Breakers vs Safety Switches



Safety switches versus AB-I breakers is an old, old controversy. Westinghouse manufactures both at their Beaver, Pennsylvania plant.

Here's their authoritative, unbiased report in the interest of better circuit protection:

Fact: AB-I's cost less. In most all motor applications, AB-I's are lower priced than an equivalent safety switch equipped with fuse. (For a rating-by-rating cost comparison, write to the Westinghouse address shown below.)

Fact: AB-I's require less mounting space. To protect a given motor size, the AB-I breaker will nearly always be smaller (up to 40% smaller, never larger) than an equivalent safety switch.

Fact: AB-I's require no maintenance. No costly fuses to replace; no production time-loss due to fuse replacements; no maintenance of any kind!

Fact: AB-I's are safer. With breaker protection, motors can't single-phase. There are no exposed live parts on an AB-I breaker to endanger workmen; no need to open the cover to reset the handle; no dangerous fuse replacements.

It's a fact. AB-I breakers are the safest, surest, least costly means of circuit protection. On your next order the best in AB-I breakers—by Westinghouse.

J-30300

YOU CAN BE SURE ... IF IT'S

Westinghouse

Westinghouse Electric Corporation
STANDARD CONTROL DIVISION
Beaver, Pennsylvania

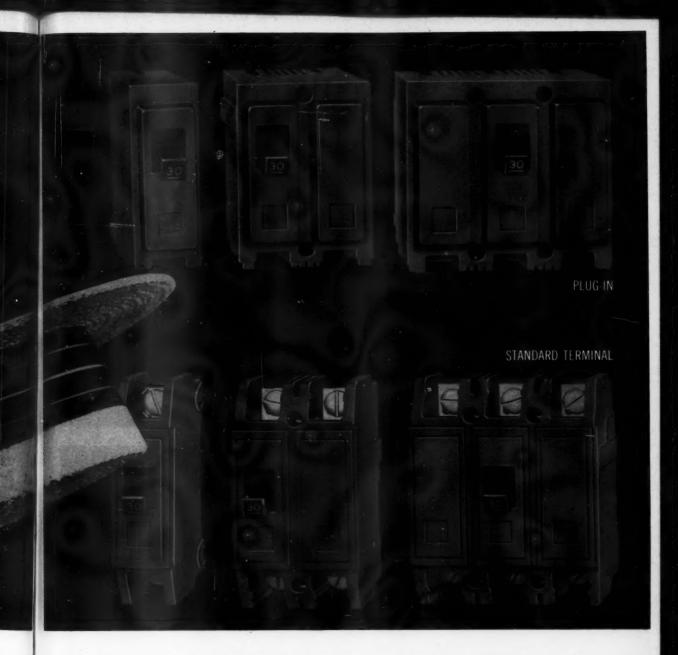






THEY'RE HERE NOW . . . AND ONLY WESTINGHOUSE HAS GOT THEM

Complete Line of Quicklag Circuit Breakers



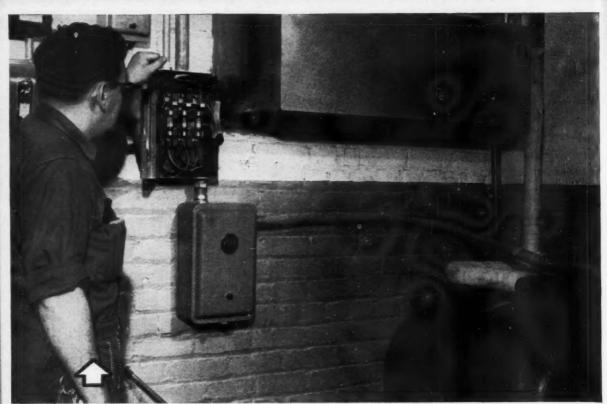
There's only one circuit breaker design best suited for lighting and power circuits—Quicklag®! And there's only one man who can offer you a full range of these small-size, high-interrupting capacity breakers—your Westinghouse Sales Representative!

These Westinghouse Quicklag circuit breakers are available now in two models—fast-mounting plug-in Quicklag P; and versatile front-connected Quicklag C. Both are available in 1-, 2- and 3-pole construction. Both incorporate all of the design features that have made Westinghouse breakers the standard for industry. For example: De-ion® arc quenchers for fast, safe arc extinguishing; quick-make, quick-break trip-free mechanism that

prevents contact "teasing"; silver-alloy contacts; insulated common-trip bar; cooperative thermal-magnetic trip; all this plus accessories and modifications for additional versatility.

A call to your local Westinghouse Sales Representative will give you the full story on the Westinghouse Quicklag line. Or you may write to: Westinghouse Electric Corporation, Standard Control Division, Beaver, Pennsylvania.

Westinghouse TAMBAD CONTROL DYNBOON
Barrer, Passagiracia



Orwille L. Welsh ASST. CHIEF ENGINEER, CONTINENTAL BAKING CO.



ELECTRICAL CONSTRUCTION AND MAINTENANCE . . . SEPTEMBER, 1958

"Experience proved to us, Fusetron Fuses could save us money and provide safer protection."... Oruille 2. Welsh

ASST. CHIEF ENGINEER CONTINENTAL BAKING CO. TOLEDO, OHIO

CASE 1

"A refrigeration compressor of ours was frequently being shutdown because the 60 amp. protection we used just could not hold the starting currents.

"After reading over Fusetron dual-element fuse literature sent to us by our company headquarters, we tried them out with great success. In the past twelve months, we have not had to go near the switch or open its cover.

CASE 2

"In another case, Fusetron fuses saved us a considerable amount of money. We installed 600 ampere Fusetron fuses in

parallel in our 1200 ampere entrance switch, rather than using the more expensive mechanical type of protective device.

"Personally, I am confident we now have better protection than we could have had with other types of protective devices." Here's why FUSETRON dual-element fuses provide safer, more dependable and money-saving protection . . . FUSETRON dual-element fuses provide 10 point protection against electrical troubles. This is unlike circuit breakers or ordinary fuses which, except in rare cases, protect only against short-circuits.

IN ADDITION:

Fusetron fuses require no mainte-

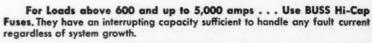
nance or recalibration. They are calibrated at the factory by engineers. Once properly installed, they require no inspection or down-time necessary on mechanically operated devices. There are no hinges, pivots or contacts to stick or get out of order. Dust, corrosion or oxidation cannot increase a Fusetron fuse's capacity or lengthen its blowing time.

After years of inactivity, a Fusetron fuse will give the same safe, dependable protection if called upon to open as it would have on the day it was installed.

Fusetron fuses have high interrupting capacity. FUSETRON fuses can safely interrupt severe short-circuit currents and are adequately safe to meet future circuit growth.

Fusetron fuses save on installation costs. Because their long time-lag prevents them from opening needlessly on motor starting currents or other harmless overloads, Fusetron fuses can be installed in sizes to approximate the load current. This protects against waste of space and money by permitting use of proper size switches and panels.

Why Risk Losses! One needless shutdown ... one lost motor ... one destroyed switch or panel ... one burned out solenoid ... may cost you far more than replacing all other types of protective devices throughout the entire installation with Fusetron dual-element fuses.



They can be coordinated with Fusetron fuses on feeder and branch circuits to limit fault outages to circuit of origin.

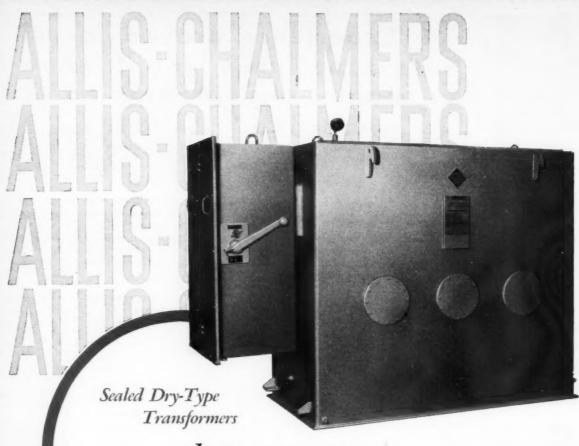
for more information write for

BULLETIN FIS on Fusetron fuses.
BULLETIN HCS on BUSS Hi-Cap fuses.

for safe, modern money-saving protection install
FUSETRON dual- element FUSES and BUSS Hi-Cap FUSES
throughout entire Electrical System!

BUSSMANN MFG. DIVISION, McGraw-Edison Company University at Jefferson, St. Louis 7, Mo.





best for Plant Service...
Station Auxiliary and Load-Center
Applications...because...

installation costs less. Your Allis-Chalmers sealed dry-type transformer is eady to be energized as soon as it arrives.

More location versatility. It can be located indoors or outdoors, overhead or underground — in flood areas, dirty and contaminated atmospheres. Bolting-down pads are conveniently located.

More safety. No fire or explosion hazard. Transformer unit is hermetically sealed in inert dry nitrogen gas.

Superior reliability. Performance is unparalleled. Contaminants and moisture cannot enter case to affect service. Oxidation of insulation material cannot take place.

Far less maintenance. Upkeep is virtually eliminated. No liquids to maintain. No need for periodic cleanout of core and coil. Tank is easy to paint.

For demonstrable proof and all the facts, call your local A-C man, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS



ADVANCE MODELLO

REVOLUTIONARY
NEW
FLUORESCENT
LAMP
BALLASTS
FOR SLIMLINE
AND RAPID
START LAMPS



Here's what KOOL KOIL will do to solve
the heat problems of the Fluorescent Lighting Industry

Advance engineers recognized the fact that to end costly condenser trouble due to ballast overheating required both design and component changes. They designed the KOOL KOIL Rapid Start case to allow a greater separation of condenser and coil. They tested new grades of steel, wire, insulation and compounds and after three years developed Kool Koil, the only ballast under comparative tests that did not overheat to temperatures exceeding the capacitor manufacturer's 70° C warranty limit.

The efficiency of KOOL KOIL Ballasts (as much as 20% less wattage loss) offers Fluorescent lighting users a saving in operating costs and the manufacturer an opportunity to increase the efficiency of its units. The higher efficiency of KOOL KOIL (up to 15% more light output) enables the user to achieve the same illumination levels with 7% fewer fixtures.

LOWER COIL TEMPERATURE

Under actual operating conditions in a surfacemounted, 4-lamp, fully enclosed unit the maximum coil temperature of KOOL KOIL Ballasts
tested was 17° C cooler than Ballast "A" and 22° C lower

than Ballast "B".

LOWER CASE TEMPERATURE

Operating in a 6-lamp recessed glass-bottom troffer, the ADVANCE Series-Sequence Ballast (RSH-2E75-S) case temperature was 18° C lower than Ballast "B" and 15° C lower than Ballast "A".

KOOL KOIL Ballasts practically eliminate ballast replacement. For every 10° C increase in case temperature over the maximum 90° C U/L limit, ballast life is cut in half. By operating with case temperatures 15 to 20 degrees cooler than ordinary ballasts, ADVANCE KOOL KOIL Ballasts give 3½ to 4 times longer life.

"The Heart of the Lighting Industry"









Mr. Kieren (right) with Mr. Al Braun of Wisconsin Bell Telephone Company.

"Every built-in telephone outlet is a talking point"

-says Mr. John Kieren, Builder, of Milwaukee, Wisconsin

"Nowadays home buyers are shopping around more than ever," says Mr. Kieren. "They compare a lot of homes before they buy. It's important to have sales features that make *your* home stand out, and my agents find that planned telephone outlets are invaluable talking points.

"The reason is simple. Telephones are important in modern living. Home owners want them conveniently located and attractively in-

stalled. As a result, the builder who plans ahead for telephone outlets is sure to be offering people what they want."

Your local Bell Telephone business office will be glad to help you with concealed wiring plans. For details on home telephone wiring, see Sweet's Light Construction File, 8i/Be. For commercial installations, Sweet's Architectural File, 32a/Be.

BELL TELEPHONE SYSTEM





Any time, any place, or any weather, the new 5464 P&S Pin Type Socket is the easy, dependable answer for temporary decorative lighting. The 5464's are applied directly to the wire. No stripping. Sharppointed pins pierce insulation forming positive wire contact with absolutely no insulation injury. Wires are firmly held in place when socket cap is tightly screwed down. Sockets disconnect easily for use over and over again.

- Streamlined, functional body sheds
- Extra ring molded in cap thrusts wires into position.
- · Wire hook supplied with every ancket.
- Contact pins riveted to prevent

Write Dept. ECM-958 for free catalog information.



Exclusive patented* four-spline construction automatically centers No. 12 or No. 14 wire insuring positive connection.

*Pat. No. 2,751,568

- · Long-life plastic cap and body.
- Rated 660 Watts, 250 Velts.
- Listed by Underwriters' Laboratories,



SEYMOUR, INC.

SYRACUSE 9, NEW YORK

St., New York 17, N.Y. 1440 N. Pulaski Rd., Chicago 51, ili. In Canada; Renfrew Electric Limited, Renfrew, Ontario 60 E. 42nd St., New York 17, N.Y.

MAKE THE COMPLETE JOB COMPLETELY PAS

Cut costs... without cutting corners! Specify... GEDNEY CONDUIT BODIES

Gedney Conduit Bodies mean lowest installed cost! That's because they are skillfully made of tough, *malleable* iron, then <u>hot-dip</u> galvanized, and finally, they must pass the toughest inspection. Accurate machining and threading assure easiest installation . . . ruggedness assures longest service life!

THE GEDNEY CONDUIT BODY LINE INCLUDES ALL TYPES-SIZES 1/2" TO 4"



TYPE LB—Threaded—for heavy-wall rigid conduit. Use them with Gedney entrance fittings, straps, clamp backs to get an *entire* conduit system that is hot-dip galvanized.

TYPE FS—Threaded—shallow bodies for heavy-wall rigid conduit. Hot-dip galvanized finish prevents corrosive deposits—means easier installation, longer life.





SCORES OF OTHER GEDNEY FITTINGS are available for every purpose—all carefully designed, manufactured and inspected to assure economical installation and maximum customer satisfaction.



GEDNEY ELECTRIC COMPANY



RKO BLDG., RADIO CITY, NEW YORK 20 Foundry, Factory and Shipping Point: Terryville, Conn.



New RIBGID Hex Wrench

with Time-Saving, Positive, 4-Sided Grip on Hex Nuts, Square Nuts, Lock Nuts, Unions

Here's the adjustable wrench you've always needed for hexes and squares, rough or finished. Extra useful on every job. No more skinned knuckles or rounded nut shoulders. New wide-open jaw goes on easy . . . won't slip off. 4-sided grip gives extra leverage. Stays to adjusted size during use.

Famous RIMID heavy-duty construction with guaranteed housing. Narrow jaw design makes work easy in tight places even on thin nuts. Comfort-grip I-beam handle has handy hang-up hole. The new RIMID Hex Wrench gives you more for your money than wrenches costing twice as much. Try it, buy it at your Supply House.

Available in 3 Sizes

No. 11, ¾" to ¾" No. 17, ¾" to 1¼" No. 25, 1" to 2"



The Ridge Tool Company Elyria, Onlo, U.S.A.



Background for Policy-Making . . . this distinguished Presidential Office . . . illuminated fittingly by

LITECONTROL

For making important decisions . . . for receiving important guests, this top executive panelled office at Holliston Mills has been functionally planned and equipped. It and the conference room (small photo) are part of a newly remodelled, two-story office building and are a tribute to the architects.

Litecontrol luminous ceilings are used in most of the private offices on the second floor. An unusual feature is the mounting of the ceilings at a slight (5°) angle. They slope downward from the window wall to the inside wall.

Another interesting feature is the "free-floating" character of the ceilings — they do not extend completely to the walls. There is a space of some 12 to 15 inches all around each luminous ceiling.

Plastic grid louvers are the diffusing medium and provide excellent intensity as well as maximum comfort in seeing. Even in the photos, the very low brightness of the louvers is apparent. (The detail in the louvers is clear despite the high intensity.)

Remember, LITECONTROL accomplishes results like this with standard fixtures that save money! Can we help you?

INSTALLATION: Holliston Mills, Inc., Norwood, Mass.

AREA SHOWN: President's Office and Conference Room

ARCHITECT: Korslund, le Normand & Quann, Inc., Norwood, Mass.

ELECTRICAL ENGINEER: Martin E. Keane Associates, Baston, Mass.

ELECTRICAL CONTRACTOR: Hixon Electric Co., Boston, Mass.

DISTRIBUTOR: General Electric Supply Co., Boston, Mass.

FIXTURES:

Lit econtrol Luminous Ceilings, using molded plastic grid louvers,

45° x 45° shielding, with 40 watt Rapid Start strip fixtures on 24° centers

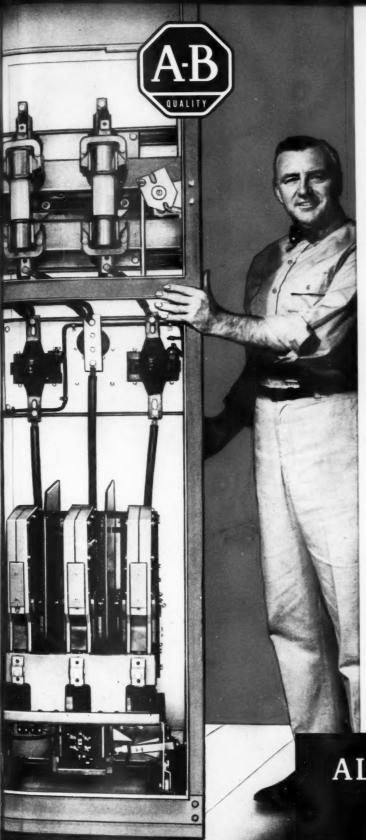


President's Office and Conference Room, average 95 foot-candles in service

LITECONTROL CORPORATION.
36 Pleasant Street, Watertown 72, Massachusetts

DESIGNERS, ENGINEERS AND MANUFACTURERS OF FLUORESCENT LIGHTING EQUIPMENT DISTRIBUTED ONLY THROUGH ACCREDITED WHOLESALERS

INTENSITIES



Tough high-voltage job?...Here's the answer!

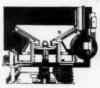
Allen-Bradley High-Voltage Air Break Starters are ideal for frequent switching, reversing, plugging, or jogging.

A tremendous operating life has been built into these high-voltage air break starters... resulting from the use of the simple solenoid contactor. It's the same design—having only ONE moving part—that provides millions of trouble free operations in Allen-Bradley's low-voltage controls. These starters are made in a complete line for all types of service. Send for Publication 6080, today.



ONLY ONE MOVING PART

With this simple solenoid design, all trouble causing pivots, pins, and flexible jumpers are eliminated. Straight upand-down motion of contactor is virtually frictionless.



DOUBLE BREAK CONTACTS

Allen-Bradley silver alloy contacts never need maintenance... they remain in perfect operating condition until completely worn away. Vertical motion assures uniform contact pressures at all times.



FASTER ARC SUPPRESSION

The air break contactor employs a completely different blowout design and novel arc chute which assure rapid arc extinction. Chutes are molded from arc resistant material.

ALLEN-BRADLEY
MOTOR CONTROL

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. In Canada: Allen-Bradley Canada Ltd., Galt, Ont.



THE ONLY LINE OF

D. C. MOTOR STARTERS

with modern

SOLENOID

With Allen-Bradley, you get D. C. motor control that is completely modern! It uses the simplest switching mechanism yet conceived . . . the solenoid contactor with only ONE moving part. There are no bearings to stick . . . no jumpers to break. This assures millions of trouble free operations. And the double break, silver alloy contacts never need maintenance. Available in ratings up through Size 4. Write for details.

CONTACTORS



Bulletin 202 solenoid type contactor. In ratings to 150 amp. Also, clapper type to 600 amperes.

FULL VOLTAGE STARTERS

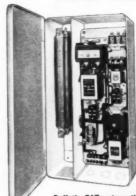


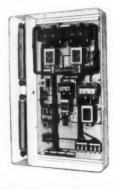
Bulletin 205 full voltage reversing starter. Ratings to 1½ hp, 115 v; 2 hp, 230 v.



Bulletin 209 full voltage starter. Available in ratings up to 1½ hp, 115 v; 2 hp, 230 v.

REDUCED VOLTAGE STARTERS





Bulletin 267 automatic time limit resistor type starters. Nonreversing (left) and reversing (right). Solenoid type to 20 hp, 115 v; 40 hp, 230 v. Clapper to 75 hp, 115 v; 150 hp, 230 v.

9-58-MR

ALLEN-BRADLEY

≥ OUALITY €

MAIN OFFICE and Factory 1316 S. Second St. Milwaukee 4, Wis.

In Canada: Allen-Bradley Canada Ltd., Galt, Ontario

Right off the Wire

An ion microscope has been made that will magnify five million times.

53

A new unit attaches to the turntable of any record player and converts it into a tape recorder.

83

All cords and cables give better service when handled properly. TIREX® portable cords and cables, although jacketed with fortified and tempered neoprene armor and "lead cured" for toughness and smoothness, will give still longer service if not subjected to unreasonable abuse.

83

A new digital computer for automatic air navigation and bombing will perform 62,500 computations per second. It is said to be the fastest airborne system.

83

Theoretically, small hydrogen bombs exploded at the rate of two an hour in an underground chamber, could produce twelve per cent of all the electric power in the United States.

83

Belt drive through variablespeed pulleys is used in a new foreign automobile.

62

Short wave radio signals have been transmitted half way around the earth without material distortion by reflecting them from a flat spot on the moon. The method might be used for intercontinental telephone calls.

8

A church in the tropics has a concrete roof covered with sprayedon white synthetic rubber. It reflects heat and has proved to be economical in application and maintenance.

8

Plans have been announced for a power transmission line to carry 750 kv, about twice the voltage now carried in this country.

rio

Sound waves are being used to weld aluminum foil.

C-L-X (sealex) is Simplex' pliable, corrugated metallic lightweight exterior sheath. It is an impervious pliable DUCT with the Simplex cable of your

choice built-in.

By using polarizing filters on searchlight lenses and filters with opposite polarization on viewing glasses, the reflections from water droplets can be minimized and better vision in fog obtained.

8

Nuclear batteries appear to be the most promising power source for the electrical systems of satellites. Heat produced by the radiation from an isotope is converted by a thermocouple into electricity.

Further information on these news items and on Simplex cable is available from any Simplex office. Please be specific in your requests.

छ

Powdered metal parts can now be made up to thirty inches in diameter.

ख

A radio that can be carried in the hand is said to be the first tubeless two-way set for use in VHF mobile communications.

8

A supersonic burglar alarm gives a warning whenever there is the slightest movement of anything within its area.

An electronic instrument can be made to talk in any language. Coded signals sent to it are converted into actual speech.

8

New fluorescent highway lamps, believed to be the most powerful in the world, give 55,800 lumens of light.

8

A car-sized heat pump is being developed that will cool or heat an automobile interior. Waterproof, heat-sealed shipping bags made of polyethylene film are said to be stronger than those made of conventional materials.

83

A tape recording system has been designed that will monitor twenty-eight radio frequencies simultaneously twenty-four hours a day.

8

A ceramic paint has been developed that does not have to be fired, will not flow at high temperatures and dries in thirty-five minutes.



TIREX® is TOUGH

"TIREX" is the trailing cable that feeds power to this giant strip mining shovel. "TIREX" cords may also carry the current to your workshop tools and be subjected to the rigors of life on portable saws and sanding machines. Tough, flexible "TIREX" assures you of long, unfailing service and unequalled economy. That's why manufacturers of quality products insist on "TIREX"® (made only by SIMPLEX).

Cambridge, Massachusetts and Newington, New Hampshire

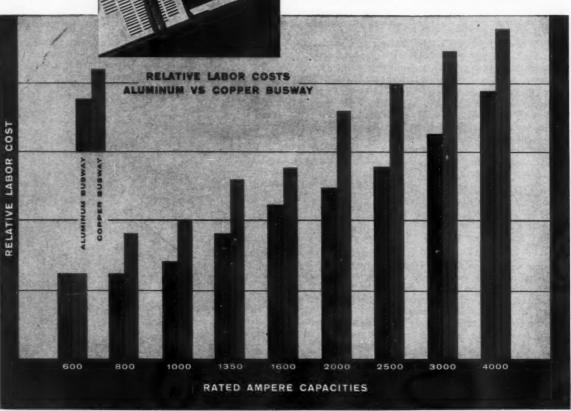
Simplex

Highest quality cables for: Mining Power & Lighting • Construction Transportation • Communications Signalling

[&]quot;The American manufacturers of transoceanic telephone cables"



Aluminum Busway costs less, installs easier, offers greater flexibility



HOW TO GET MORE FOR YOUR ELECTRICAL DISTRIBUTION DOLLAR

Lightweight aluminum busway systems are one of the biggest bargains in the building industry. Here is a product that meets your electrical requirements at the lowest possible cost. The aluminum in busway saves you up to 20 per cent on material cost, up to 20 per cent on installation cost and offers you savings in weight permitting the use of less costly busway supports. In addition to savings, flexibility is another big benefit you get with busway. Future loads can be tapped off at any point to meet your new or expanded power needs without tearing down switchboards or adding feeder cable and conduit. Pound for pound, aluminum busway has greater current-carrying

capacity than cable in conduit, with no increase in temperature or voltage drop. It also requires less space.

When you need a modern, flexible distribution system, specify busway made with Alcoa* Aluminum... and save. Aluminum Company of America, 2302-J Alcoa Bldg., Pittsburgh 19, Pa.



Your Guide to the Best in Aluminum Value



"ALCOA THEATRE"
Exciting Adventure
Alternate Monday Evenings



New Space-Saving 1" Double Pole Breaker Adds Flexibility to Cutler-Hammer Unit Breaker Load Centers

Here's important news for you and your customers. New space-saving Cutler-Hammer double pole breakers provide a low cost means for expanding household circuit facilities without installing additional branch circuit units. These new breakers require ½ less bus space which means wherever, within their ratings, two double pole breakers are presently

installed you can now provide your customer with three double pole circuits. Also, if a homeowner wants an additional lighting circuit, you can replace a present double pole breaker with one of the new space-saving double pole breakers and a single pole

ires

bu-

oa®

y of

Pa.

breaker. You only pay for the new breakers . . . no new cases or costly installation effort needed.

The new Cutler-Hammer double pole breakers are available in 15, 20, and 30 ampere ratings; and can be installed in any Cutler-Hammer Unit Breaker Load Center without special adapters or case modifications. Order dependable Cutler-Hammer

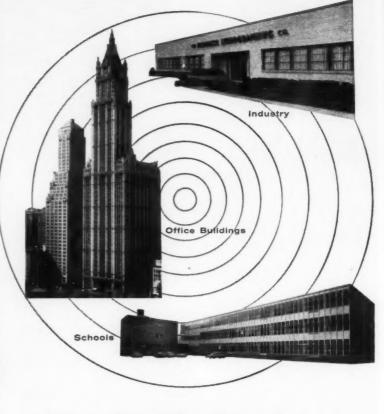
Service Entrance Equipment from your nearby Authorized Cutler-Hammer Distributor, or write for the new Cutler-Hammer Merchandiser, EA100-S241 the handy selection guide. Cutler-Hammer Inc., Milwaukee 1, Wisconsin.



Cutler-Hammer Inc., Milwaukee, Wis. Division: Airborne Instruments Laboratory. Foreign: Cutler-Hammer International, C. A.

Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation, Inc.





Our business is communications

. . . a gentle chime . . . a blasting horn . . . or a complete audio-visual communication system

Sperti Faraday leads in the instant sound or sight communication systems that speed today's business or institutional contacts. Whatever your problem, whether simple or complicated our engineers are at your service to assist you in designing the system that suits your needs.

This service is available to users without obligation. Simply call your nearest Sperti Faraday representative or write to Sperti Faraday, Inc., Adrian, Michigan. *In Canada*, write Sperti Faraday, Ltd., Montreal.



VISACALL Closed Circuit TV For Supervision of Hospital Patients Visacall-6

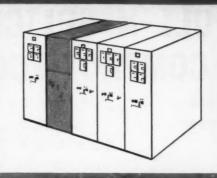
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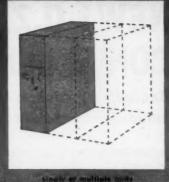
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SINCE 1875 DESIGNERS AND PRODUCERS OF VISUAL AND AUDIBLE SIGNALS Adrian, Michigan

Specialists in: FIRE ALARM SYSTEMS . ELECTRICAL CLOCK SYSTEMS . HOSPITAL PATIENT OBSERVATION . CLOSED CIRCUIT TV . AUDIBLE SIGNALS . ANNUNCIATORS . CODED PAGING SYSTEM . SYNCHRONOUS CLOCKS . TRANSFORMERS . CONTACT DEVICES







Installation versatility with

General Electric ROLLOUT

Switch and Fuse Equipment

You have a choice of construction types with General Electric's Rollout Switch and Fuse Equipment. It can be furnished to suit your installation needs—indoor or outdoor units, single or multiple units, or in line-up with General Electric Metal-clad.

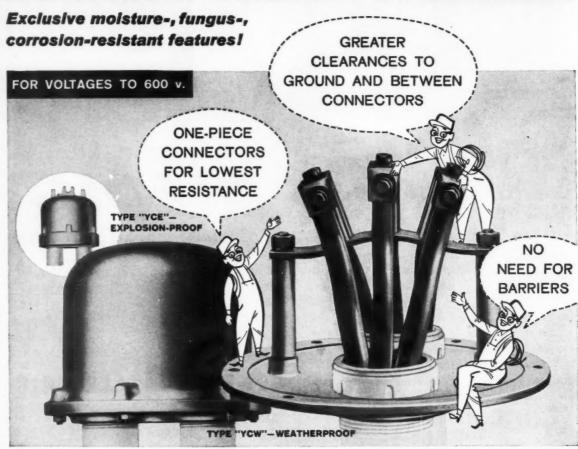
Whichever type of construction you select you get improved protection, greater safety, and ease of maintenance and inspection. For more information call your nearest General Electric Apparatus Sales Office or write for Bulletin GEA-6623, General Electric Co., Section B514-5, Schenectady, New York.

Progress Is Our Most Important Product

GENERAL (ELECTRIC



NEW! O.Z. PULL-N-SPLICE BOXES! CONVENIENT · COMPACT · ECONOMICAL



O.Z. Pull-n-Splice Boxes mark a significant advance in pull box construction!

Their highly compact size saves more space than ever!

Their more efficient design means new savings in installation time and laborl

Their moisture-, fungus-, and corrosion-resistant features mean long, trouble-free service.

Still, with all their features, the new O.Z. Pull-n-Splice Boxes are smaller — and cost far less than conventional pull boxes ... even late model competitive types! And, you get a bonus in high quality materials and workmanship so characteristic of all O.Z. products!

For complete information on these and the many other O.Z. products that mean more for you, call your local O.Z. distributor, or write to the company.



FOR VOLTAGES TO 5000 v.

Type "YPW" - Weatherproof Type "YPE" - Explosion-proof

> Deeper dome than "YCW" and "YCE". Furnished without connector panels. Insulated pigtail splices recommended.



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CABLE TERMINATORS POWER CONNECTORS

SOLDERLESS CONNECTORS
GROUNDING DEVICES
CONDUIT FITTINGS

INTERLOCKED ARMOR









Sign of greater opportunities for you

EVERY one of the Honeywell products shown on this page is sold through electrical contractors. Every one will help you get larger contracts, more profits. And every one is backed by the kind of support that only Honeywell offers in your fieldhelp with planning and checking each system, assistance with installation problems and Honeywell service during your guarantee period.

If you haven't yet experienced this special Honeywell support and found out how much it can help your business, talk to a contractor who has. If you want more information about any product shown here, call your local Honeywell office or write Minneapolis Honeywell, Dept. EC-9-130, Minneapolis 8, Minnesota.

Honeywell H First in Control



· Trademark



Honeywell Clockmaster* Systems. Both minute impulse systems and synchronous-wired provide: hand-some clocks in 9", 12", 15" or 18" dials, flush or surface mounted. Easy installation with standard plug-and-socket connections . . no soldering. Simplified link-chain programming. Easy to read, understand, and set. Simplest, most trouble-free system available.



Honeywell Fire Alarm. Reports fires automatically both within building and to local fire station. Transmits alarms even with ground, break or power failure. Locates fire by numbered light. Easy to install. Detectors fit standard 3" box or plaster ring. UL approved for auxiliary, local, and sprinkler waterflow alarm systems.



Honeywell Hotel/Motel Master*. Replaces legwork with cheaper, faster electrical signals. Puts up to 24 functions under one-man control. Custom designed to any hotel or motel specifications. Honeywell helps with installation problems, backs your guarantee.



Honeywell Light Saver.* Phototube and control panel automatically turn artificial lights on and off as needed to supplement daylight. Tests prove savings as high as 80% on lighting bills. Helps owner use natural lighting to fullest advantage. Honeywell helps with installation problems, backs your guarantee.

ECON dual-element cartridge fuses combine

EXTRA PROTECTION

with "QUICK as a WINK" ACTION!





These new buildings for the Staff and Product Engineering activities of the Ford Motor Company at Dearborn, Mich., are striking examples of structures designed to provide for the specific needs and comforts of the people who work there.

Only the finest equipment has been installed in these buildings, including electrical wiring of the highest quality, consisting of dependable Phelps Dodge building wire and Phelps Dodge paper-insulated lead-sheathed power cable.

On every wiring job where top-quality performance, expert workmanship and experienced "know-how" are called for, it pays to rely on Phelps Dodge and your Phelps Dodge distributor!

PHELPS DODGE COPPER PRODUCTS

CORPORATION



SALES OFFICES: Atlanta, Birmingham, Ala., Cambridge, Mass., Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Dayton, Detroit, Fort Wayne, Greensboro, N. C., Houston, Indianapolis, Jacksonville, Kansas City, Mo., Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Partland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.

NEW MANUAL STARTER

that challenges comparison!



 Here is a new manual started designed to provide standards of protection and performance normally associated with magnetic starters. It can be used wherever relatively small motors (up to 71/2 HP) are started across-the-line, and remote control is not required.

Compared feature by feature with other manual starters, the new Clark Type "CM" is readily recognized as the outstanding leader in its field. Some of these features are listed at the right. It is available in sizes 0 and 1, non-reversing, reversing and two-speed types, open and enclosed models.

Write for descriptive Bulletin 6002 CM.

Compare these features

- * SMOOTH, POSITIVE OPERATION Unique design of over-center, toggle type operating mechanism gives exceptionally smooth, positive snap-action opening and closing, and virtually eliminates danger of accidental operation by shock or vibration.
- RUGGED CONSTRUCTION One piece housing molded of strong non-carbonizing material com-pletely shrouds operating mechanism to protect from dust and dirt. Built-in arc barriers prevent flash-overs even under heavy overloads.
- STRAIGHT-THRU WIRING—Line terminals at top and load terminals at bottom simplify installation.
- RECESSED OPERATING HANDLE No danger of accidental operation when in "OFF" position, yet easy to operate, even with gloves on. "OFF", "RESET" and "TRIPPED" conditions clearly
- TRIP-FREE OPERATION When melting-alloy overload relay trips and opens starter, contacts cannot be reclosed until overload relay and motor cool to safe operating temperature. Contacts can-not be held closed against an overload.
- TEASE-FREE MECHANISM Snap-action contacts cannot be opened or closed slowly.
- . LARGE, DOUBLE-BREAK, NON-WELDING CON-TACTS - Long wearing silver-alloy contacts give extra long life and high current carrying capacity.
- SIMPLIFIED MAINTENANCE—Contacts easily inspected and replaced from the front without removing starter from cabinet.
- MORE FAIL-SAFE Positive-acting mechanism has dual operating springs, either one capable of operating starter.
- OPTIONAL THIRD-LINE OVERLOAD-For threephase applications requiring overload protection in each line, a third built-in overload is available, or may be added in the field.
- THREE SAFE-LOCKING FEATURES Standard INKE SAFE-OCKING FRIUMES—Standard locking devices include: interlock to prevent removal of cover when starter is "ON"; safety latch on the operating lever which can be set to lock starter in "OFF" position, and cannot be released with the cover padlocked. Optional device also available permits padlocking starter in either "ON" or "OFF" position.

AND MANY OTHERS



Cleveland 10, Ohio

Everything Under Control TTU 1146 East 152nd Street . Cleveland 10, Ohio
IN CANADA: CANADIAN CONTROLLERS, LIMITED . MAIN OFFICES AND PLANT, TORONTO



MY29-3 HYTOOL connects copper and aluminum...without changing dies!



No die inserts to change... to identify... to store or mislay! A twist of the wrist, and you're ready to connect any of the wire sizes #8 thru 250 copper... #8 thru 4/0 aluminum... with a single stroke! The cable-size scale (below) positions the nest die for copper. An aluminum scale on reverse side of tool doubles its versatility. MY29-type Hytools also install mining, aircraft, flexible and extra-flexible cable, and other special conductors.

This rugged, lightweight tool is inexpensive, too

only... \$3600

Ask your Burndy distributor for a demonstration.

BILL

Norwalk, Connect. • Toronto, Canada

56-23

ELECTRICAL CONSTRUCTION AND MAINTENANCE . . . SEPTEMBER, 1958



SWITCH

PIPE

To carry good engineering over

SEALTITE COMES IN THREE TYPES:

TYPE U.A.— Specifications for Type U. A. (Underwriters' Laboratories Approved) and Type C. S. A. (Canadian Standards Association Approved). Construction: flexible galvanized steel core, positive ground and tough extruded outer cover.

TRADE		ISIDE METER		OUTSIDE DIAMETER		WGT.
(Ins.)	Min.	Max.	Min.	Max.	DIAM.	100 Feet)
3/8	.484	.504	.690	.710	6	30.0
3/2	.622	.642	.820	.840	7	36.6
3/4	.820	.840	1.030	1.050	10	48.2
1	1.041	1.066	1.290	1.315	12	87.7
11/4	1.380	1.410	1.630	1.660	15	116.5

TYPE E. F. * is extra flexible—for machine tools and industrial equipment.

It meets J.I.C. requirements.

TRADE SIZE								APPR. INSIDE BEND	WGT.
(Ins.)	Mirr.	Max.	Min.	Max.	DIAM.	100 Feet			
3/6	.485	.500	.695	.710	5	24			
1/2	.620	.635	.825	.840	5	29			
3/4	.815	.830	1.035	1.050	6	39			
1	1.030	1.050	1.295	1.315	8	67			
11/4	1.370	1.390	1.635	1.660	10	87			
11/2	1.575	1.595	1.875	1.900	12	105			
2	2.020	2.040	2.350	2.375	15	135			
21/2	2.480	2.505	2.850	2.875	20	198			
3	3.070	3.100	3.470	3.500	26	282			
4	4.000	4.040	4.460	4.500	34	414			

Commercial tolerances apply on above figures.

WHERE TO GET SEALTITE — Electrical Wholesalers stock Sealtite with gray or black cover in easy-to-handle cartons or on reels. Be certain you ask for and get the quality conduit marked "Sealtite" on the cover. Buy it in long lengths and cut it on the job without waste. Your wholesaler also stocks liquid-tight connectors.

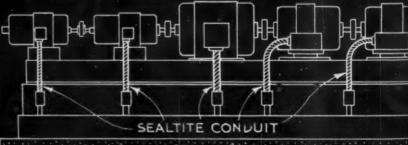
Free Booklet S-539 gives you full information on Sealtite. For your copy, write: The American Brass Company, American Metal Hose Division, Waterbury 20, Conn. In Canada, Sealtite is approved by Canadian Standards Association, and sold by Anaconda American Brass Ltd., New Toronto, Ont.

FOR WET SPOTS



MOVING CONNECTIONS





vertrom plans to performance insist on **SEALTITE**

the original flexible, liquid-tight electrical conduit that protects wiring against oil, grease, water, dirt, chemicals, corrosive fumes, salt spray, weather.

EALTITE is a flexible and liquid-tight lectrical conduit. It gives maximum protection to your wiring when it nust connect moving parts, absorb ibration, follow machine contours, flex into U-bends, be easily maintained or be safeguarded between misaligned outlets.

It is being used successfully in wet locations, in tunnels, power plants, steel mills, canneries, chemical plants and in many outdoor applications.

Insist on the conduit marked



Flexible, Liquid-Tight Conduit

an ANACONDA product



anada, TUTAWAY SECTION of Type U.A. Sealite shows tough polyvinyl jacket over lexible galvanized steel core. Copper anductor wound spirally inside conduit ves positive ground.

nadian

, New

OUTDOORS

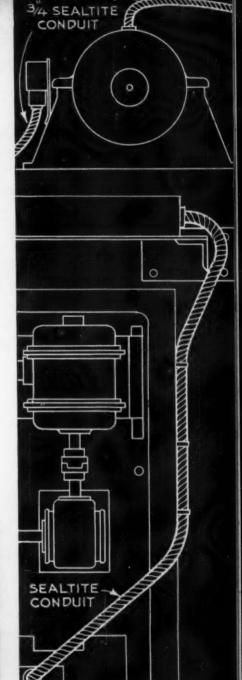


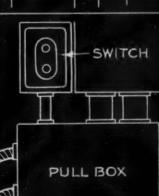


MISALIGNMENT













Here is a complete and low-priced line of D-LUGS. These connectors are more compact and heavier in weight to insure cooler operation under more severe loads, while being much easier to install. Only seven sizes accommodate from 14 SOL. to 1,000,000 CM.

FEATURES:

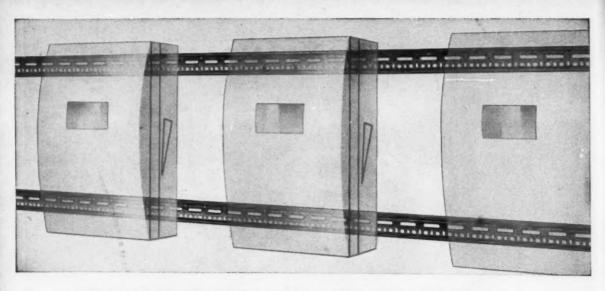
- · Rugged construction
- Made of high conductivity copper alloy
- Suitable for all purposes
- Variable, each connector takes wide range
- Exceptionally compact
- · Reusable

Write for detailed information and prices!



DOSSERT MFG. CORP.

249 Huron Street, Brooklyn 22, N.Y. Representatives in all principal cities IN CANADA: W. S. Gerrie 6 Assoc., Ltd., Toronto



Reduce Electrical Installation Costs... frame with



DEXION SLOTTED ANGLE

Why Acme Steel Dexion cuts installation costs: Dexion Slotted Angle frames so conveniently because the scientifically engineered slot and hole patterns always match up; electrical components can be mounted so easily on a Dexion frame because a slot or hole is always available. You can install multiple components of relays, instruments or switchgear without wasting time in drilling or welding.

Dexion Slotted Angle projects are started and completed at the job site—it measures, cuts and bolts in fast, simple succession with amazing speed. A single downstroke of the Dexion Cutter shears squarely and cleanly; a single wrench draws up all bolts.

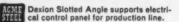
Acme Steel Dexion Slotted Angle is strong-

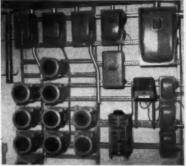
rigidly holds many hundreds of pounds—and is available in either standard or heavy-duty gauge. Edge-smooth, cold rolled Acme Steel Dexion is galvanized for rust and corrosion resistance, is completely re-usable, over and over.

Many contractors regularly depend on Acme Steel Dexion because of its versatility, lightweight strength and compactness. Dexion Slotted Angle comes in 10 or 12-foot lengths, ten pieces to a package which includes 75 nuts and bolts and takes less than the space of two 2 x 4's.

Learn how Dexion Ideas have cut costs for others. Write, today, for framing ideas and the name of your distributor to Dept. EBD-98, Acme Steel Company, Chicago 27, Illinois.







AGME Dexion Slotted Angle frames instru-STEEL ment control housing and switch gear.



ACME Dexion Slotted Angle speeds installa-STEEL tion of lighting fixtures.



DEXION SLOTTED ANGLE

277/2014 CENTRAL

"SO EASY, IT AMAZED ME".

31/2

2214



So says electrical contractor, Mr. John Lockshaw of Downey Electric Co., Downey, California about a recent installation of the Sunbeam SIGHTLINE® system. He further states, "We believe that the following are the reasons why this lighting job went up so fast and neatly: The fixtures are completely assembled, prewired and ready for connecting circuit leads. The hangers just thread into the swivel sockets. It takes but a twist of the wrist to clamp the system to the mounting plates on the ceiling. The spring-loaded bottom swivels and perfectly balanced fixtures eliminate on-the-job leveling problems. Continuous rows are quickly achieved by interlocking units on sturdy support channels. Fine vertical adjustments can be made after fixtures are hung by turning finger-controlled "hex" nuts.

It also amazed us to see these Sunbeam SIGHTLINE® units go up with so

It also amazed us to see these Sunbeam SIGHTLINE® units go up with so little need for tools."

Because SIGHTLINE[®] is a truly integrated, totally indirect lighting system which produces wide spread illumination with absolutely no glare, direct or reflected, it is being specified more and more for interiors where the utmost visual comfort is required.



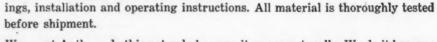


"We Hooked it Up and Walked Away"

In the electrical signaling and communication industry this expression, coming from an electrical contractor, is the highest recommendation he can give of a manufacturer's equipment. It means "Well done! Your system installed easily and worked properly the first time. No rejects... no grounds or shorts... no trouble shooting, with all that means in running up the cost of a job. It worked like a charm!"

We're accustomed to hearing this expression quite frequently at Auth. Our equipment has always been designed to make installation easy. We give the contractor what he needs . . . wiring diagrams, equipment draw-







We... at Auth... do this not only because it comes naturally. We do it because every time a contractor says to us "We hooked it up and walked away," we know that he'll be coming back to us on the next job. That's good will,

Manufacturers of

ELECTRICAL SIGNALING, TIME AND COMMUNICATION SYSTEMS FOR HOSPITALS, SCHOOLS, HOUSING, INDUSTRY AND SHIPS Sold in cooperation with the distributor

Auth Electric Company, Inc.

HERE'S double PROTECTION



NOW galvanized Sherarduct is coated with NEW

FORMULA MVC-1

the modified vinyl copolymer that provides the most effective barrier against corrosive agents of all kinds

National Electric has developed a new way to combat conduit corrosion. It is called Formula MVC-1, a new modified polyvinyl chloride resin coating that's available only from National Electric.

Here's what MVC-1 does to even further increase the protection against corrosion offered by the Sherardizing process of galvanizing.

RESISTANCE TO CORROSIVE ATTACKS-In accelerated salt spray, sulphuric acid and caustic tests conducted by the Pittsburgh Testing Laboratories, new Sherarduct with Formula MVC-1 far outlasted all hot dipped and other high-grade coated and galvanized conduits tested.

RESISTANCE TO FLAKING-Formula MVC-1 makes a tight, uniform, adhesive coating that withstands bending without cracking or flaking.

TEMPERATURE RESISTANCE—Formula MVC-1 is extremely resistant to high and low ambient temperatures and will withstand the majority of all industrial temperature conditions.

NOW ADD THIS NEW CORROSION RESISTANCE TO SHERARDUCT'S OTHER FEATURES

- 1. The Sherardizing process of galvanizing that alloys zinc with the conduit walls.
- 2. Normalized, highly ductile steel for easy bending and
- 3. Zinc protected threads for complete end-to-end pro-

These are the features that convince architects, engineers and contractors it is best to specify National Electric Sherarduct when real corrosion protection is required. Write for complete information on new Sherarduct today.

Listed by Underwriters' Laboratories, Inc.

Sherarduct is Galvanized Conduit at Its Best

National Electric Products Corp.



PITTSBURGH 22, PENNSYLVANIA

SALES OFFICES LISTED UNDER

Bennett Associates, Inc.

Sales Offices and Warehouses in Principal Cities

Sylvania Fluorescents give your customers more light—

at lower cost than all other brands!

Superior engineering makes Sylvania fluorescent lamps better in many important ways... makes every lamp a better tool of production and sales to increase your customers' profits.

Today, good lighting is more than illumination . . . it is a basic tool of production and sales. Sylvania, with this important premise always at work, offers your customers a complete line of modern fluorescent lamps that assures efficient lighting . . . provides performance that means maximum service from their present fluorescent lighting system, and a higher return on their investment in the illumination of offices, factories or stores.

Why Sylvania lamps are best

It takes many things to make better fluorescent lamps. That's why ordinary fluorescents cannot match Sylvania lamps for light output, lamp life and dollar-for-dollar lighting value.

The reason? Sylvania builds many important major features into fluorescents.

Check these many points of superiority. See for yourself why your customers get more and save more . . . why you make more. Notice, too, that Sylvania makes its most important comparisons with other brands . . . not with Sylvania products of the past.

Sylvania fluorescent lamps are as much as 14% brighter

Tests in the laboratory and working installations demonstrate that Sylvania lamps consistently deliver more light.

Equally important, during the past two years, an actual comparison of Sylvania fluorescent lamp performance with that of other brands shows Sylvania to deliver as much as 14% more light, depending on the lamp type.

Thus, you get the maximum light you expect . . . all the light you pay for . . . from the start.

Sylvania's greater maintained brightness means 7 lamps free for every hundred you use

Sylvania fluorescents maintain their greater brightness throughout useful life. For example, at 3,000 hours, in a single-shift operation, 100 Sylvania lamps deliver the light output of about 107 ordinary fluorescents. In effect, you

get a dividend of light equal to 7 free lamps... more light-per-lamp from the power you pay for.

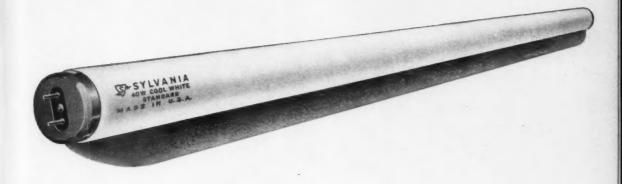
Sylvania welds all bases . . . eliminates faulty lamp contact

Sylvania welds the tube-to-base contact points in all its fluorescent lamps. Other brands use soldered contacts.

By welding, Sylvania completely eliminates the corrosion caused by soldering. Faulty lamp contact so common with ordinary fluorescents is eliminated. As a result, Sylvania fluorescents burn brighter far longer . . . save dollars and time in lamp maintenance.

Only Sylvania's exclusive coating process homogenizes phosphors for maximum brightness

Year after year, Sylvania lamps have delivered more light for a far longer time than ordinary fluorescents because of superior phosphors. In fact, only now are some other brands being introduced with phosphors of a quality which Sylvania has long since improved.



In addition, Sylvania uses an exclusive coating process which more uniformly distributes these superior phosphors throughout the tube. This unsurpassed uniformity is made possible by homogenizing the phosphors—and, in itself, contributes a minimum of 3% greater brightness over other processes now in use.

Sylvania lamps are 99.9% free of performance defects

Every lamp that leaves the plant is subjected to the infallible scrutiny of electronic devices that test and inspect for every possible flaw. One unit, for example, is so critical it can detect, in a fraction of a second, a lamp leak that would otherwise not become apparent until after many months of use. In this way you are assured of the highest lamp quality and performance.

Revolutionary VHO first lamp to give 250% as much light as a standard tube

The Sylvania VHO (Very High Output) lamp represents a major break-

through in fluorescent lighting. It produces 2½ times the light output without changing the size or shape of the tube.

The high intensity lighting "punch" of Sylvania's VHO offers new lighting levels that make it practical for the first time to gain the advantages of fluorescent lighting for High Bay installations, and for Outdoor illumination.

VHO lamps cost less to buy—less to use, and maintain greater brightness throughout life than other types of very high intensity fluorescents.

These facts are presented in the interest of demonstrating how better lighting is possible at a lower cost...how it contributes to increased production and working efficiency, and supports the many factors that reduce operating costs to improve your customers' profits.

We believe this concrete evidence of Sylvania's superiority in fluorescent

lighting will earn the serious consideration of every executive or purchasing authority you sell . . . and add immeasurably to your volume and profit.

Promote the Sylvania line—take advantage of the extra sales edge it offers. And for any assistance or literature, call your local Sylvania Representative or write us today.

Signed,

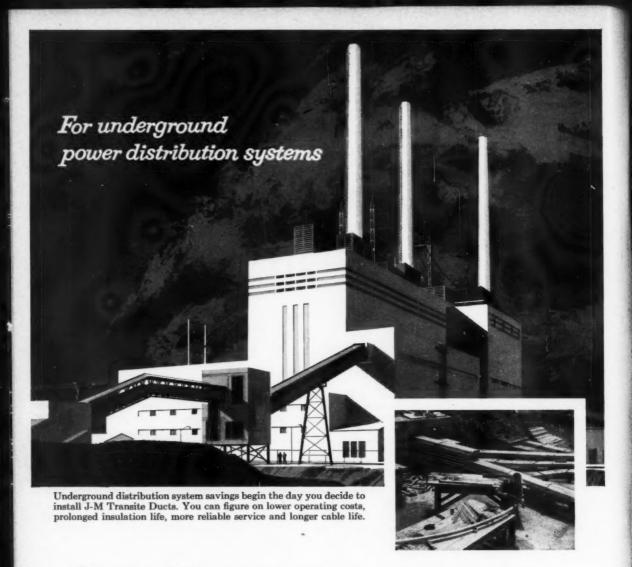
F. J. HEALY, President

SYLVANIA Lighting Products

A Division of SYLVANIA ELECTRIC PRODUCTS INC.

In Canada: Sylvania Electric (Canada) Ltd., Shell Tower Building, Montreal

Dept. 8L-8309, 60 Boston Street, Salem, Massachusetts



J-M Transite Ducts permanently resist fire and arc... provide lifelong dependability, many operating economies

CONE ARE MANY of the headaches of transmitting heavy electrical loads underground, when you protect cables with Johns-Manville Transite® Ducts. They assure you of greatest protective value, and maximum load capacity, per dollar invested.

And when cable fire or failure occurs, noncombustible Transite Ducts remain undamaged and can be used again for the new lines. Regardless of conditions, Transite Ducts provide permanent service as they do not deteriorate from heat, water or corrosive soils.

Tests have shown that Transiteprotected cables run cooler under given loads . . . carry greater loads at given temperatures because Transite helps dissipate heat faster. And for lower operating costs, consider the long-range value of Transite Ducts in terms of (1) increased insulation life, (2) fewer cable failures, and (3) lower I²R losses for the full working life of a system.

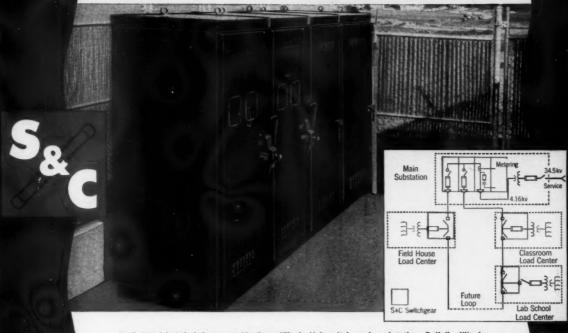
For details on Transite Ducts' many advantages, distribution engineers are invited to write for informative brochure EL-29A. Johns-Manville, Box 14, New York 16, N.Y. In Canada, 565 Lakeshore Road East, Port Credit, Ont.



JOHNS-MANVILLE



For your high-voltage power circuits-



S&C Metalclad Switchgear at Northern Illinois University's main substation, DeKalb, Illinois. Resident Architect: Kenneth Thelen; Consulting Engineer: S. W. Knetsch & Associates, DeKalb; Electrical Contractor: Virgil Cook & Sons. The unit shown is the main substation secondary gear. Three other S&C units (see one-line diagram) serve as the primary switchgear for the three load centers.

Buy the <u>right</u> protection in your switchgear...buy S&C metalclad switchgear...save 50%

Institutional and industrial high-voltage power circuits, such as that shown here, do not have transient faults. They cannot be re-energized immediately following an outage. Thus the use of costly circuit breakers is unnecessary. The right protective devices for such circuits are S&C Power Fuses.

For such high-voltage power circuits, conductors run in cables or conduits. They are not exposed to lightning, falling trees, rodents, wind, or ice which cause transient faults on overhead circuits typical of electric utilities.

Consequently, the only faults that occur are permanent faults, and S&C Power Fuses give the right protection against them. The quick reclosing feature of expensive circuit breakers is of no value here. S&C Metalclad Switchgear—by using S&C Power Fuses rather than circuit breakers and by incorporating load interrupters for full load switching—brings a substantial savings in switchgear costs, sometimes as much as 50%.

S&C Electric Company, 4433 Ravenswood Ave., Chicago 40, Ill. In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario.

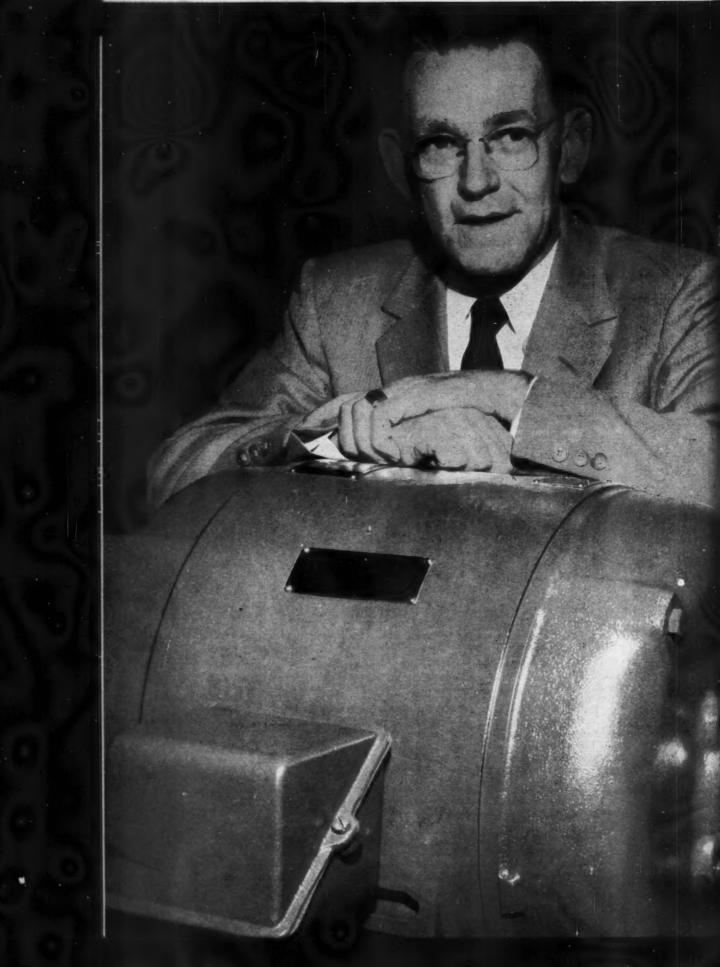


Substation Primary

Main Substation Secondary

Switching Cente

Service Entrance



How to cut costs with the RIGHT motor

Don't be baffled by power factors, torques, efficiencies, and starting, accelerating, and thermal characteristics, or housing, horsepower and speed control. Let Century Electric help you balance these factors to cut operating costs with the *right* motor.

Here's how Century Electric can help you:

10,000 choices—Century Electric engineers can help you specify the right motor without having to rely on a few types to do all jobs. Century Electric makes a complete variety of integral horsepower motors. Over 10,000 types up to 400 hp. There is one for every type of equipment—transfer machines, ball mill drives, compressors, drilling machines, lathes, etc. For all operating conditions too—dusty, corrosive, explosive or moist.

Long life motors—And you get years of dependable operation from Century Electric motors. They are manufactured to rigid quality standards. Electrical tests and other checks on operating characteristics made during manufacture assure you the best motor for your money.

Application know-how—Every Century Electric sales engineer knows motor drive systems because he sells motors and nothing but motors. Often he can give you on-the-spot answers. If not, he can turn to an engineering staff that comes up with quick answers.

You can get the right motor for your equipment just by contacting your nearest Century Electric Sales Office or Authorized Distributor. A Century Electric sales engineer will be glad to help you.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri Offices and Stock Points in Principal Cities



WELDING— No blistering of plating in the weld area



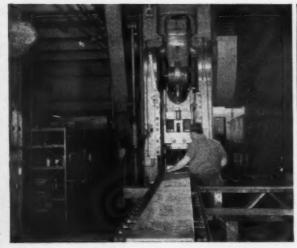


FORMING- No breaking or peeling around bends





PUNCHING- No traying or chipping around edges of punched holes





60

ELECTRICAL CONSTRUCTION AND MAINTENANCE . . . SEPTEMBER, 1958

R&IE fabricates REYNOLDS New Silver Plated Bus Bar with ease

Punching, Forming And Welding Operations
Performed After Plating With Positive Results



The silver plating of aluminum bus bar by Reynolds is a factory process designed and controlled to provide the quality of plating required.

I-T-E Circuit Breaker Company's, R & IE Division at Greenburg, Pennsylvania has put their fabricating know-how to work on Reynolds new Silver Plated Aluminum Bus Bar with significant results. Their techniques and the characteristics of the Reynolds product assure economy and efficiency in bus systems.

Photographs on the facing page show how R & IE performs various fabricating operations on plated bus bar for an extensive bus system to be used in a large electro-chemical installation. Note that the aluminum bus bar is punched, formed and welded without damage to the plated surface. There is no fraying or chipping around the edges of the punched holes... no breaking or peeling at bends... no blistering of the plating in the weld areas.

Reynolds Silver Plated Aluminum Bus Bar was used for three important reasons:

- 1. Plated aluminum bar is lower in cost than equivalent copper bar.
- 2. Plating provides for simple, inexpensive, reliable electrical connections.
- Reynolds is the first commercially available plated aluminum bar with established quality standards.

And, now, R & IE also knows that this plated bus bar can be fabricated by their time and labor saving techniques without damage to the plated bar. It is possible to produce high quality aluminum bus bar systems for large installations quickly, effectively and economically.

For details and availability data write today for new brochure, "Reynolds Silver Plated Aluminum Bus Conductors", Reynolds Metals Company, P. O. Box 2346-ET, Richmond 18, Virginia. For assistance from Reynolds Engineering Service call your nearest Reynolds office or write to the above address.



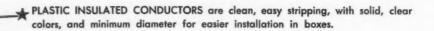


REYNOLDS ALUMINUM

CRESCENT

ABC ARMORED CABLE TYPE ACT

IS EASIER AND QUICKER TO INSTALL



PAPER TAPE which is tough, moisture-resistant yet easily removed, gives protection to the insulated conductors.

INSULATED BUSHING for protection against sharp ends of armor, furnished with each coil of cable.

BOND STRIP UNDER ARMOR is used in all sizes. A flattened aluminum bonding wire in contact with the under side of each convolution of the galvanized steel armor assures a permanent, low resistance through armor to ground.

PREFABRICATED BREAKING LINES. At intervals of every 1½ inches on CRESCENT ABC Armored Cable you will find a small cut mark. This cut mark shows the location of a prefabricated breaking line inside the armor.

Only a few short strokes of a hacksaw guided by the cut mark are required to cut through ONE outer ridge, and a bend by hand severs the armor. By actual test, this saves 30% of the time ordinarily required. A clean separation results, with no sharp edge. There is no chance of injury to insulation because only one OUTER ridge is cut.

The prefabricated breaking lines in the armor are so made that THERE IS NO REDUCTION of tensile strength, bending qualities, crushing resistance or electrical conductivity. This armor construction meets all requirements of Underwriters' Laboratories.





CRESCENT INSULATED WIRE & CABLE CO.

Trenton, New Jersey

Electrical Construction and Maintenance

The Tap Exception

Basic rules of the Code are, in many instances, amended by exceptions applying to particular circumstances. Strict application of the principle under field conditions may be impractical and inconvenient or at odds with other rules. Such exceptions, properly interpreted and applied, do not seriously erode the principle they amend.

In time the original intent of certain exceptions become obscured, and, by literal interpretation, the rule is likely to be extended to applications never contemplated at the time of its adoption. An important example is the so-called "25 foot tap rule" (2434d) which first appeared in the 1931 Code and was taken from a similar rule going back to 1925 applying only to motor circuits.

The rule permits a feeder to be tapped by a smaller conductor without overcurrent protection providing the run is short and terminates in an appropriate overcurrent device. It is a practical and useful exception to the fundamental rule that overcurrent devices shall be located at the point where the conductor to be protected receives its supply. It is an exception, however, and was never intended as a systematic escape from the basic rule.

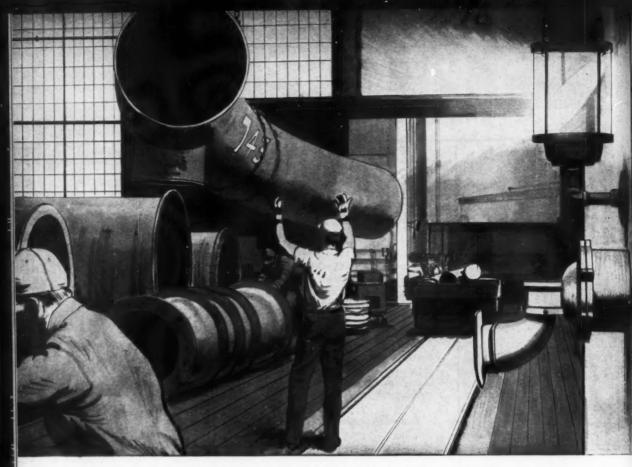
From time to time we hear about ingenious wiring layouts based upon a literal application of 2434d, typically for systems serving groups of unit air conditioners. A feeder is run through the area with unprotected branch taps of smaller conductors extending to outlets containing fuses or circuit breakers. The taps are usually contrived to come within the "legal" limit of 25 feet.

It should be apparent to those experienced in electrical construction practice that this kind of layout has substantial lengths of conductor overfused by as much as 300 percent. Furthermore the taps are for all intents and purposes branch circuits, whatever else they may be called. And branch circuits of this type are not recognized in Article 210.

Such systems offend the principle of 2434 and involve a gross distortion of the intent of the 25-foot tap exception. They also ignore the rule (3808) calling for the grouping of fuses and circuit breakers "so far as practicable". They can probably be held to comply in a narrow literal and legal sense with the Code but certainly not with its obvious intent.

The Code and common industry practice provide for straight-forward wiring systems with conductors properly protected at the point of supply in conventional panelboards. We are not aware of any compelling practical need at this time to escape from the simple principles involved. Probably, in due time, we shall find other and possibly better methods, but they are not going to come from analyzing the Code in search of obscure loopholes in its exceptions.

Um. T. Stuart



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GRAYBAR ELECTRIC COMPANY, INC., 420 LEXINGTON AVENUE, NEW YORK 17. NEW YORK, IN OVER 130 PRINCIPAL CITIES

Electrical Construction and Maintenance

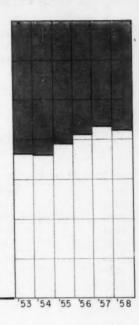
GROSS NATIONAL PRODUCT

(Billions of Dollars)

Year	Current Dollars
1953	363.2
1954	361.2
1955	391.7
1956	414.7
1957	434.4
1957—3rd Q	440.0*
1957—4th Q	432.6*
1958—1st Q	425.8*
1958—2nd Q**	428.0*

^{*}Seasonally adjusted annual rates, by quarters

Source: Office of Business Economics, Dept. of Commerce



National Trends Point to

Upturn in the Electrical Industry

This Annual Statistical Summary presents latest available data on the national economy and the electrical industry. It is prepared to show trends which will help you plan your 1959 objectives more intelligently.

By Berlon C. Cooper

THE electrical industry as a whole has weathered the recent recession better than most industries. It is true, of course, that some branches of the electrical group, notably the electrical appliance manufacturers, experienced fairly sharp declines in sales. On the other hand, electrical contractors, motor repair shops, electrical design engineers, and others maintained operations at or near their peak plateau, and overall dollar volume, nationally, increased slightly.

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CITIES

Now, with major trends and key indicators pointing to an economic upturn, electrical business management once again faces the problem of planning its objectives for the year ahead. This year, perhaps more importantly than ever before, early and critical analysis of the total business climate, of changing trends in the many specific factors which influence the markets for electrical goods and services, is called for. Each year, business planning becomes more complicated. Competition gets keener, buyers become more critical, and markets become more difficult to develop and hold. Thus management needs all the information and assistance it can get to meet and solve these and similar planning problems.

Presented here are the latest available statistics on the national economy and on the electrical industry. These statistics are shown both in graphic form, for quick interpretation, and in table form, for more detailed study. These statistics have been assembled and are presented at this time so that they will be available now, for our readers, and to aid them in the early planning of their objectives for 1959.

^{**}Preliminary Estimate at mid-1958



The National Economy

INDUSTRIAL PRODUCTION TURNS UP

(FRB Index-1947-49=100)

Year	Index	Unadjusted		
1952	124	Monthly		
1953	134	111000		
1954	125			
1955	139			
1956	143			
1957	143			
1957 July		135		
1957 Aug.		145		
1957 Sept.		146		
1957 Oct.		146		100 ton
1957 Nov.		141		100
1957 Dec.		134	1.18	
1958 Jan.		132	208	1 0 mm
1958 Feb.		131	100	1000
1958 Mar.		129		
1958 Apr.		127		STEVE VI
1958 May		128		
1958 June		130	52	35 5
Cause Endard Dass	mus Board		52	'5

The nation's economy, on the decline from last August to about mid-May, has leveled out and is now on the upturn. Careful analysis of key indicators conclusively bears out this optimism. Just how fast the economy will recover, and how high it will climb, is still a matter of speculation. But the economic climate is favorable for new growth, and some of the usually reliable economists predict last year's record peaks will be reached by year's end, or early in 1959.

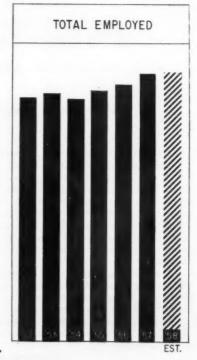
Proof that the upturn is now a fact is inherent in the broad variety of increases in demand and activity, which have occurred separately and more or less simultaneously. Some of the major ones are: defense outlays and public works spending began expanding in April; housing starts turned up beginning in March; personal income reversed its downtrend in May; industrial production started climbing in May and June after an eight month's de-

EMPLOYMENT AND UNEMPLOYMENT

(Based on Total Civilian Labor Force)
(Thousands)

		Emp	Employed		
Year		Agricultural	Nonagricultural	Total	Unemployed
1953		6,562	55,651	62,213	1,602
1954		6,504	54,734	61,238	3,230
1955		6,730	56,464	63,193	2,654
1956		6,585	58,394	64,979	2,551
1957		6,222	58,789	65,011	2,936
1957	July	7,772	59,449	67,221	3,007
44	Aug.	6,823	59,562	66,385	2,600
u	Sept.	6,518	59,156	65,674	2,552
ш	Oct.	6,837	59,168	66,005	2,508
66	Nov.	5,817	59,057	64,873	3,188
"	Dec.	5,385	59,012	64,396	3,374
1958	Jan.	4,998	57,240	62,238	4,494
44	Feb.	4,830	57,158	61,988	5,173
a	Mar.	5,072	57,239	62,311	5,198
66	Apr.	5,558	57,349	62,907	5,120
66	May	6,272	57,789	64,061	4,904
66	June	ng	na	64,981	5,437

Source: Office of Business Economics, Dept. of Commerce



FEDERAL SPENDING*

(Billions of Dollars)

The rate of Federal spending is up about \$4 billion from a year ago, and will continue to advance during the current 1959 fiscal year. The increase is for both defense and nondefense spending. Spending last year (fiscal 1958, ended June 30) totaled about \$73 billion, while revenues were only \$70 billion, leaving a \$3 billion deficit. Total military outlay in fiscal 1958 was \$43.5 billion, and will rise an estimated \$2 billion this year, another \$2 billion in fiscal 1960. Revenues this year (fiscal 1959) will drop as result of the recession, and estimates of next year's deficit are for from \$8 to \$12 billion.

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State and local government spending is also rising, and will be at annual rate of billion (excluding Federal grants-in-aid) by next year. Total government spending (Federal, state and local) will therefore increase by an estimated 5% per year over the normal growth rate of the economy, by the end of next year. Thus government spending increases, added to increases in construction spending, inventory replacement and accumulation, and a growing market for services, will provide a powerful stimulus to the economy.

Fiscal Year	Major National Security	Interest	Veterans Services and Benefits	Other**	Total
1953	51,830	6,583	4,298	11,563	74,274
1954	47,872	6,470	4,256	9,174	67,772
1955	42,089	6,438	4,457	11,586	64,570
1956	41,825	6,846	4,756	13,113	66,540
1957	44,414	7,308	4,793	12,918	69,433

*Budget expenditures for fiscal years ending June 30th of each year.

**Includes: International affairs and finance, labor and welfare, agriculture and agricultural resources, natural resources, natural resources, and finance, labor and welfare, agriculture and agricultural resources. Source: Federal Reserve Bulletin, May 1958.

STATE AND LOCAL GOVERNMENT SPENDING

(Millions of Dollars) Public All Fiscol Other** Education Highways Welfare Total Year 4,650 2,788 10,340 1952 26,098 8,318 1953 27,910 9,390 4,987 2,914 10,619 5,527 3,060 11,556 30,701 10,557 1954 12,196 11,907 6,452 3,168 1955 33,724 1956 36,711 13,220 6,953 3,139 13,397

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na *Fiscal years not the same for all governments.

1957

**Includes: Expenditures for health, hospitals, police, local fire protection, natural resources, sanitation, housing and community redevelopment, local recreation, general control, interest on general debt,

na

Source: Department of Commerce (Census Bureau)

cline; employment increased in May for first time since last August; and gross national product increased during second quarter. These gains are mutually supporting and, when combined, add up to a new pattern of economic growth.

Gross national product bottomed in first quarter of 1958 at \$425.8 billion, eased up to \$428.0 billion in second quarter. Predicted GNP for third quarter is \$432 billion, climbing to about \$445 billion annual rate by year's end. This would put 1958 equal to 1957's boom peak.

Industrial production peaked at 146 (unadjusted monthly) FRB Inlast September, declined steadily to 127 in April, a 13% drop, then turned up in May and June at 128 and 130 respectively. At this rate, it would reach 140 by yearend.

Employment declined to 62 million in February, has now climbed above 65 million, and employees are working more hours per week. Workers are making more money, overall, as personal income reached a new high in June. Consumer spending is now expected to start gaining as workers become convinced the recession has run its course and jobs are more secure.

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PERSONAL INCOME

(Billions of Dollars)

		Dis-		
ear	Total Income	posable Income*	Personal Savings	
952		236.7		
953	286.0	250.2	19.7	
954	287.4	254.5	17.9	
955	305.9	270.2	15.8	
956	326.9	287.2	20.0	
957	343.4	300.6	20.2	
957-3rd Q**	346.9	303.3	19.7	
957-4th Q**	345.5	302.1	19.8	
958-1st Q**	342.5	300.1	18.9	
050 2 1 0 **	-			

*After Taxes *Seasonally adjusted annual rates by quarters ross Federal Reserve Board

CONSUMER SPENDING

(Billions of Dollars)

Non-

	Yea		durable Goods	Services	Total	
	195	2 26.6	116.1	75.6	218.3	
	195	3 29.8	119.1	81.7	230.5	
	195	4 29.4	120.6	86.6	236.6	
	195	5 35.6	126.0	92.8	254.4	
	195	6 33.9	133.3	99.9	267.2	
	195	7 35.1	140.0	105.4	280.4	
3rd (2* 195	7 35.0	142.5	106.1	283.6	
4th (2* 195	7 34.5	141.0	107.0	282.5	
1st (2* 195	8 31.5	141.5	108.2	281.2	-
2nd (2* 195	8 na	na	na	na	1

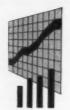
*Seasonally adjusted annual rates by quarters Source: Office of Business Economics, Dept. of Commerce

CONSUMER CREDIT

(Millions of Dollars)

End of Year	Total Credit	Install- ment Credit	Non- install- ment Credit
1952	27,401	19,403	7,998
1953	31,243	23,005	8,238
1954	32,292	23,568	8,724
1955	38,670	28,958	9,712
1956	42,097	31,827	10,270
1957	44,776	34,105	10,671
Jan. 1958	43,966	33,737	10,229
Feb. 1958	43,043	33,302	9,741
Mar. 1958	42,562	32,983	9,579
Apr. 1958	42,665	32,932	9,733
May 1958	na	na	na

Source: Office of Business Economics, Dept. of Commerce



ANNUAL STATISTICAL SUMMARY

The Electrical Industry

BETTER business ahead seems assured for the electrical industry. This optimistic conclusion is made following an analysis of a broad range of statistics, presented in these pages, relating both directly and indirectly to the electrical industry.

First are the national economy statistics on the previous three pages. The status of the national economy affects the electrical industry indirectly, in general, and perhaps directly in some instances. For example, a growing gross national product (GNP) reflects a healthy economy, overall, and this in turn provides an optimistic business climate conducive to growth in the durable goods industries and service industries, including all branches of the electrical industry. An increasing GNP thus promotes electrical growth indirectly. On the other hand, increased defense spending, especially for military establishments, missile bases, and projects involving building construction, creates markets directly for electrical goods and products.

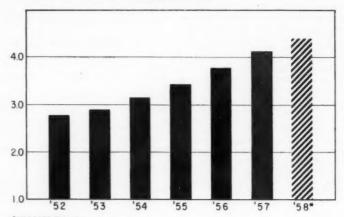
Presented on this and the following pages are statistics relating more or less directly to the electrical industry, or to those factors which directly affect or measure its growth. In general, a time base has been selected for each statistical subject which is sufficiently broad to show the general growth trend, and to give the relative declines over the past 12 months, during the recession period, in relation to the normal growth trends. Monthly or quarterly figures over the past year are given, where available, to permit a closer analysis of specific trends during the recession.

Business Recovery

It is generally agreed by most economists that the economic decline started about August 1957. Most economic factors peaked during the second and third quarters of last year. Also, economists believe

ELECTRICAL WORK IN BUILDING CONSTRUCTION

(Billions of Dollars)



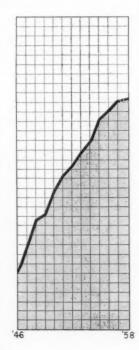
*Mid-1958 Estimate
Source: Electrical Construction and Maintenance

CONSTRUCTION SPENDING CONTINUES UPWARD

(Annual Expenditures in Current Dollars)
(Value, in Millions of Dollars)

Year	Private	Public	Total
1946	10,375	2,362	12,737
1947	14,481	3,434	17,915
1948	18,395	4,827	23,222
1949	17,759	6,404	24,163
1950	22,954	7,001	29,955
1951	23,320	9,419	32,739
1952	23,849	10,901	34,750
1953	25,724	11,394	37,118
1954	27,679	11,922	39,601
1955	32,620	11,961	44,581
1956	33,287	13,005	46,292
1957	34,138	14,354	48,492
1958*	34,505	14,960	49,465
*****	. /		

*EC&M Estimate (mid-year 1958) Source: BLS and Dept. of Commerce





the recession hit its low point during the second quarter of this year. Housing starts turned up slightly in March, industrial production hit its low in April, employment hit its low in February, unemployment peaked in March (except for June when a new influx of school graduates came into the field), and gross national product was at its lowest total (annual rate) during the first quarter.

Obviously, not all the readjustments necessary for a sound recovery have been made. Auto production is still way down. Steel production has turned up, but is running at only about 60% of capacity. Costs are still high, and many are still rising—particularly labor costs. The cost-of-living is at a

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record high, but rises on a monthto-month basis over the past few months have been only minor.

Overall, most economists believe business recovery is already underway, and that the fourth quarter will be the best of the year, paving the way for strong, sound and vigorous growth in 1959.

Electrical Construction

Electrical contractors are in an enviable position. Their dollar volume for the year as a whole will total about \$4.5 billion, up about 10% from their total volume last year. Reason for this, of course, is that total building construction this year is slightly outpacing last

year's record, and more of the total new construction dollar is going into electrical work. In modernization work, the percentage is even greater. This, of course, reflects advancing technology, and a higher degree of electrical utilization.

The electrical construction market is contingent primarily upon new construction work. This is especially true in new construction involving new buildings, which in turn require electrical utilization devices. Basically, nearly all types of new construction, including streets and highways, for example, requires some electrical construction work, but the percentages of electrical work dollar volume to total construction dollar volume

BUT CONSTRUCTION PHYSICAL VOLUME HAS DECLINED

(Annual Expenditures in 1947-49 Prices)
(Value, in Millions of Dollars)

Year	Private	Public	Total	
1946	13,500	2,992	16,492	
1947	15,415	3,674	19,089	
1948	17,624	4,611	22,235	
1949	17,306	6,221	23,527	
1950	21,270	6,720	27,990	
1951	20,015	8,312	28,327	
1952	19,889	9,234	29,123	
1953	20,958	9,501	30,459	
1954	22,526	10,086	32,612	
1955	25,810	9,892	35,702	
1956	25,928	9,970	34,898	
1957	24,663	10,763	35,426	
1958*	24,289	10,685	34,974	'46 '5

*EC&M Estimate (mid-year 1958) Source: BLS and Dept. of Commerce

COMPARISON OF CONSTRUCTION PHYSICAL AND DOLLAR VOLUME

(1947-49 Average Prices vs Current Prices)
(Millions of Dollars)

			1947-4	
Year	Prices Prices	1947-49 Ratio Prices	Current	
1946	12,737	16,492	1.29	
1947	17,915	19,089	1.06	
1948	23,222	22,235	.97	
1949	24,163	23,527	.98	
1950	29,985	27,990	. 93	
1951	32,739	28,327	. 87	
1952	34,750	29,123	. 84	
1953	37,118	30,459	.82	
1954	39,601	32,612	. 82	
1955	44,581	35,702	. 80	
1956	46,292	34,898	.76	
1957	48,492	35,426	.73	
1958*	49,465	34,974	.71	

*EC&M Estimate (mid-year 1958) Source: BLS and Dept. of Commerce



ANNUAL STATISTICAL SUMMARY

vary from one type of construction to another. Thus the type of construction mix from one year to another can and does affect the total dollar volume of electrical construction

New Construction

New construction work has been one of the steadying influences in the national economy throughout the recession. Monthly totals, measured in current prices, have consistently risen each month over the corresponding month of a year earlier. Further, construction is running at an annual rate of about 12% of the total economy (GNP) this year, compared with approximately 11% in 1957. This factor, plus increases in modernization of existing plants and facilities, which in most cases have involved extensive upgrading of electrical facilities, accounts for the approximate 10% increase in electrical construction work estimated for 1958 over 1957

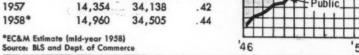
New construction statistics for 1958 have been estimated, based on the only statistics available. These are shown in the table "Construction Outlook Remains Good". Total volume for each type of construction was projected for 1958, based on the total volume for 1957, plus the rate of change (increase or decrease) reflected by the total of the first five months of 1958 over the first five months of 1957, and further modified as considered appropriate in view of additional factors, such as Federal grants and legislation designed to spur activities in certain types of public works. This estimate indicates an approximate 2% increase overail for 1958 construction over the 1957 total.

The 1958 increase in new construction is based on current prices, and therefore does not take into account the inflation of the dollar, or the effect of continually rising costs and prices. In order to arrive at a comparison of physical volume,

PUBLIC CONSTRUCTION SPENDING OUTPACES PRIVATE SPENDING

(Millions of Dollars in Current Prices)

	Total	9-4-4	Public
Year	Public	Total Private	Private
1946	2,362	10,375	.23
1947	3,434	14,481	.24
1948	4,827	18,395	.26
1949	6,404	17,759	.36
1950	7,001	22,954	.30
1951	9,419	23,320	.40
1952	:10,901	23,849	. 46
1953	11,394	25,724	.44
1954	11,922	27,679	. 43
1955	11,961	32,620	.37
1956	13,005	33,287	.39
1957	14,354	. 34,138	. 42
1958*	14,960	34,505	. 44



CONSTRUCTION OUTLOOK REMAINS GOOD

(Billions of Dollars-Current Prices)

Total New Construction	1957
Private Construction 34,138 12,531 34,505 Residential building (nonform) 17,019 6,116 17,175 New dwelling units 12,615 4,545 12,400 Additions and alterations 3,903 1,325 4,100 Nonhousekeeping 501 246 675 Nonresidential building 9,556 3,515 9,250 Industrial 3,557 1,183 2,900 Commercial 3,564 1,338 3,650 Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	_
Residential building (nonform) 17,019 6,116 17,175 New dwelling units 12,615 4,545 12,400 Additions and alterations 3,903 1,325 4,100 Nonhousekeeping 501 246 675 Nonresidential building 9,556 3,515 9,250 Industrial 3,557 1,183 2,900 Commercial 3,564 1,338 3,650 Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	
New dwelling units 12,615 4,545 12,400 Additions and alterations 3,903 1,325 4,100 Nonhousekeeping 501 246 675 Nonresidential building 9,556 3,515 9,250 Industrial 3,557 1,183 2,900 Commercial 3,564 1,338 3,650 Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	
Additions and alterations 3,903 1,325 4,100 Nonhousekeeping 501 246 675 Nonresidential building 9,556 3,515 9,250 Industrial 3,557 1,183 2,900 Commercial 3,564 1,338 3,650 Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	+ 1
Nonhousekeeping 501 246 675 Nonresidential building 9,556 3,515 9,250 Industrial 3,557 1,183 2,900 Commercial 3,564 1,338 3,650 Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	- 2
Nonresidential building 9,556 3,515 9,250 Industrial 3,557 1,183 2,900 Commercial 3,564 1,338 3,650 Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	+ 5
Industrial 3,557 1,183 2,900 Commercial 3,564 1,338 3,650 Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	+35
Commercial 3,564 1,338 3,650 Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	- 3
Office buildings and warehouses 1,893 817 2,250 Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building	-19
Stores, restaurants and garages 1,671 521 1,400 Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	+ 2
Other nonresidential building 2,435 994 2,700 Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	+19
Religious 868 319 850 Educational 525 211 550 Hospital and Institutional 525 252 750	-16
Educational 525 211 550 Hospital and Institutional 525 252 750	+11
Hospital and Institutional 525 252 750	- 2
	+ 5
	+43
Social and recreational	+13
Miscellaneous	- 3
Farm construction	+ 1
Public Utilities 5,774 2,241 6,310	+ 9
Railroad 406 130 360	-11
Telephone and telegraph 1,068 389 950	-11
Other public utilities 4,300 1,722 5,000	+16
All other private	-15
Public Construction	+ 4
Residential building	+58
Nonresidential building	- 1
Industrial	-31
Educational	+ 4
Hospital and institutional	- 7
Administrative and service 439 175 450	+ 3
Other nonresidential building 416 169 440	+ 6
Military facilities	- 5
Highways	+ 7
Sewer and water systems 1,344 523 1,310	- 3
Sewer	+ 2
Water 563 215 510	- 9
Public service enterprises	+ 2
Conservation and development 971 352 1,050	+ 8
	1 0
All other public	+ 7

*Estimated by Electrical Construction and Maintenance Source: BLS and Dept. of Commerce

CAPITAL EXPENDITURES DECLINE FROM 1957 PEAK

(Plans for Capital Spending in Millions of Dollars)

Year		All Business
1957 Actual		38,437
1958 Planned		34,011
% Change 1957-	-58	-12
Preliminary Plans	1959	31,322
	1960	30,608
	1961	29,684

Sources 11th Annual Survey—McGraw-Hill Department of Economics

INDEX OF VALUATION PER SQUARE FOOT OF FLOOR AREA*

Year										Index**
1947.				٠					٠	89
1948					,					96
1949.										104
1950.										111
1951.		٠								119
1952										126
1953.							۰			134
1954.										
1955.										149
1956.										157

^{*}By selected types of building and year of contract award

Source: F. W. Dodge Corp., BLS, and Dept. of Commerce new construction has also been measured in constant, or 1947-49 dollars (see chart "But Physical Volume Has Declined"). This analysis indicates that physical volume in 1958 will trail 1957 by a little over 1%.

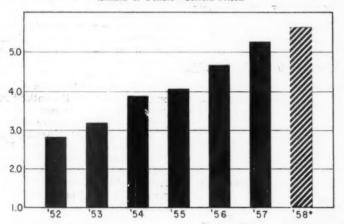
Public Construction Up

The construction spending with public funds is outpacing that with private funds. During 1958 public construction will increase about 4% over that for 1957, while private fund construction will rise only about 1%. The ratio of public to private fund construction will be about .43, up from .37 in 1955, or up from .23 in 1946. The ratio peaked at .46 in 1952, as a result of government expansion of industrial facilities during the Korean crisis, and primarily for the Atomic Energy program. During 1958 the major increases in public construction will be in residential building and for highways, with some increase in hospital and institutional construction.

Total construction in July hit a new record for the month, \$4.6 billion. This was a gain of more than \$200 million from the \$4.4 billion total in June, and topped the \$4.5

HIGHWAY CONSTRUCTION VOLUME IS GROWING

(Billions of Dollars-Current Prices)



*EC&M Estimate (Mid-1958)
Source: BLS and Dept. of Commerce

RESIDENTIAL CONSTRUCTION SPENDING MAINTAINS CONSTANT RATE

(Annual Volume in Current Prices)
(Millions of Dollars)

Year	Private	Expenditures Public	Total
1950	14,100	345	14,445
1951	12,529	595	13,124
1952	12,842	654	13,496
1953	13,777	556	14,333
1954	15,379	336	15,715
1955	18,705	266	18,971
1956	17,632	292	17,924
1957	17,019	506	17,525
1958*	17,175	800	17,975

*EC&M Estimate (Mid-year 1958)
Source: BLS and Dept. of Commerce

BUT PHYSICAL VOLUME DECLINES

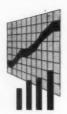
(Annual Volume in 1947-49 Prices)

(Millions of Dollars)

Year	Private	Expenditures Public	Total
1950	13,019	321	13,340
1951	10,795	512	11,307
1952	10,772	550	11,322
1953	11,365	459	11,824
1954	12,777	281	13,058
1955	15,078	213	15,291
1956	13,613	225	13,838
1957	12,903	383	13,186
1958*	12,268	571	12,839

*EC&M Estimate (Mid-year 1958)
Source: BLS and Dept. of Commerce

^{**}Calculated trend, for all selected types of building (commercial, Institutional, residential nine specified types)



ANNUAL STATISTICAL SUMMARY

UNIT COST PER HOUSE IS INCREASING

A—in Current Prices, and B—in 1947–49 Prices

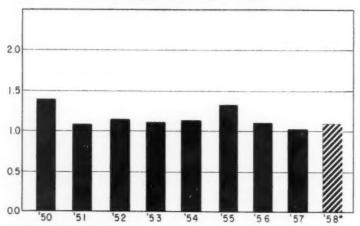
(Millions of Dollars)

	Total Ex Current	penditures 1947–49		(Dollars)			
Year	Prices	Prices	Units	A	В		
1950	\$14,445	\$13,340	1,396.0	\$10,350	\$9,560		
1951	13,124	11,307	1,091.3	12,000	10,350		
1952	13,496	11,322	1,127.0	11,910	10,050		
1953	14,333	11,824	1,103.8	13,000	10,700		
1954	15,715	13,058	1,220.4	12,860	10,700		
1955	18,971	15,291	1,328.9	14,250	11,500		
1956	17,924	13,838	1,118.1	16,005	12,400		
1957	17,525	13,186	1,041.9	16,850	12,610		
1958*	17,975	12,839	1,050.0	17,105	12,210		

*EC&M Estimate (Mid-1958)
Source: BLS and Dept. of Commerce

DEMAND FOR NEW HOMES HAS EASED IN PAST TWO YEARS

(Housing Starts Annually, in Millions)



*EC&M Estimate (Mid-1958)
Source: BLS and Dept. of Commerce

billion total for July 1957. Estimates for the first seven months of this year reflect a 5% rise in public construction from the similar 1957 period. Public construction outlays were in excess of \$8 billion, up from \$7.7 billion for the first seven months of last year.

Private construction declined slightly during the first seven months of 1958, from similar period last year. This year's total was \$18.6 billion, compared with last year's total of \$18.8 billion. Biggest declines were in industrial construction and stores.

Capital Expenditures Drop

Business has cut its rate of spending for capital goods purchases sharply from a year ago. The record rate of spending was set during the third quarter of 1957, at an estimated \$37.75 billion annual rate, according to Depts. of Commerce and Labor. By the first quarter of this year, the annual rate had dropped by some \$5 billion, leading to a forecast of a 17% drop for 1958 from the year earlier record, based on a joint survey made by Depts. of Commerce and Securities and Exchange Commission. This survey indicated that the decline would maintain through the third and fourth quarters of this year. This sharp decline, attributed to corporations' "adjustments of basic programs", has been considered by many economists as a key factor in the recession. While capital spending was previously expected to continue its decline through the second half of this year, it has already begun to level out, and now with the outlook improving rapidly, this may lead to a gradual upturn by year's end.

McGraw-Hill's 11th Annual Survey of Business' Plans for New Plants and Equipment for 1958-1961 reflected the same trend, but for a smaller decline of 12%, compared with the Commerce-SEC indication of 17%.

Square Foot Valuation

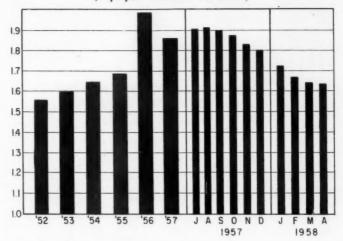
The average construction contract price per square foot of floor area increased by more than 75% between 1947 and 1956, according to a new index prepared by F. W. Dodge Corporation. Data are based on selected types of buildings (nine types) in 37 eastern States, involving 4.8 million projects valued at \$90.8 billion, and resulting in 9.4 billion square feet of floor area over the ten year period.

Highway Construction

Of growing interest to the electrical industry is the steadily expanding and sizable highway construction program. This interest is sparked by the fact that highway dollar volume is now in excess of

ELECTRICAL WORKERS IN CONTRACT CONSTRUCTION

(Employees-Hundred Thousands)



Source: BLS and Dept. of Commerce

10% of total construction dollar volume, and the percentage of this dollar volume going into electrical work is greater than had been generally known, and is constantly increasing. Statistics on this electrical work are not available. But on project after project, it has been found that electrical contracts are sizable. Electrical work is involved on every tunnel, viaduct, long bridge, etc., and at approaches and exits for lighting, for air-conditioning of tunnels, for drawbridge lifts, and similar applications.

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During the first half of 1958, the estimated value of work done ran only 5% ahead of 1957 similar period, on a total volume of \$2.2 billion. Highway work in June, however, was \$580 million, a year-to-year gain of 16%, and matching last September's record. Estimates for 1958 total highway construction vary from \$5.6 billion up to \$6.6 billion.

Highway construction to date, under the Federal Highway Act of 1956, has been a little disappointing, however. Some of the reasons are that states are having trouble securing rights of way, and states and local governments have been diverting funds from wholly state or local projects to those in which the federal government shares.

Residential Building

Homebuilding was already in a deep slump last year when the recession hit. Annual starts were at the lowest level (1,041,900) since 1950, when the post World War II record of 1,396,000 starts was set.

A record 1,328,900 housing starts were made in 1955 following the emergency cutback in homebuilding during the Korean crisis. Then the slide began, and was not checked until April of this year. The monthly starts in February were at an annual rate of 915,000, seasonally adjusted, moved up to 918,000 annual rate in March, then to 950,000 in April, and to 1,010,000 in May. June starts were at an annual rate of 1,136,000 BLS reported,

ELECTRICAL WORKERS' EARNINGS ARE INCREASING

	Year	Average Weekly Hours	Average Weekly Earnings	Average Hourly Earnings	
	1953	39.3	\$111.61	\$2.51	93.5
	1954	38.6	112.71	2.92	
	1955	39.1	116.52	2.98	
	1956	39.5	125.61	3.18	
	1957	39.2	132.10	3.37	
1957	July	39.3	132.83	3.38	
	Aug.	39.2	132.50	3.38	
	Sept.	39.5	134.30	3.40	
	Oct.	39.5	135.49	3.43	
	Nov.	37.5	128.25	3.42	
	Dec.	39.4	134.75	3.42	
1958	Jan.	38.7	132.35	3.42	
	Feb.	37.5	128.25	3.42	
	Mar.	38.2	132.17	3.46	
	Apr.	38.1	132.97	3.49	53

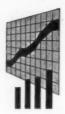
Sources BLS, Dept. of Labor

highest for any month since June 1956. Easier credit, and a step-up in Federal housing, are considered major factors in this upturn.

Measured in dollar volume, the housing construction performance is not nearly as drastic as all the headlines have indicated. BLS figures show a record \$18,971 million volume in 1955, and a decline to \$17,525 million, or 7.6%, in 1957. This is only slightly above half the drop experienced in industrial production from last September to April of this year. Prospects are for an increase in homebuilding

dollar volume of about \$2 to \$2.5 billion annually through 1959. With electrical utilization on the increase in new homes, this growing homebuilding market will be good news for the electrical industry, and an added boost to the economy.

Physical volume in homebuilding, however, is still on the decline, when measured in terms of constant dollars (see chart based on 1947-49 prices). This indicates that the about-turn in homebuilding is based on lower-cost houses. This fact is further reflected in the chart "Unit Cost Per House Is Increas-

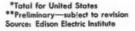


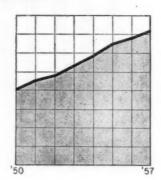
ANNUAL STATISTICAL SUMMARY

TOTAL ELECTRIC POWER GENERATING CAPACITY KEEPS GROWING*

(Thousands of Kilowatts)

Year													Total Installed Capacity
1950.													82,850
1951.								0	0		0		90,127
1952.													97,312
1953.					0		٠	,		0			107,354
1954.													118,878
1955.	٠		۰	٠			۰					٠	130,896
1956.													137,342
1957.	0	0	0		0	۰		0					145,689*





ing", based on 1947-49 prices. Note that current prices still reflect an increase, which is accounted for by the growing inflation of the dollar.

Electrical Workers

Electrical workers in contract construction dropped considerably from a high of 190,500 in July of 1957 to April of this year, latest date for which figures are available. This was accounted for by the decline in residential building, and bad weather during the first quarter of this year. With both homebuilding and new construction on the rise, electrical workers in construction are again increasing.

FUTURE NEED FOR ELECTRICAL POWER IS PROJECTED

(Estimated installed generating capacity and electric power output needed to supply future requirements)

Year	Installed Capacity (Thousand Kw)	Electric Output (Million Kwhr)
1960	182,500	802,000
1965	236,000	1,043,900
1970	292,500	1,298,000
1975	355,000	1,572,600
1980	422,500	1,866,400

Note: In 1957, total installed generating capacity was 145,689,000 kilowatts, of which 128,737,000 kilowatts was electric utility owned, and 16,952,000 kilowatts was in industrial, mine, railway electric and similar power plants. Projection for 1980 is for 394,000,000 kw in electric utility plants, 28,500,000 kw in other plants.

Source: Federal Power Commission

Load estimates shown in table at left were prepared by Federal Power Commission, based upon a 1975 population of about 222 million for the nation as a whole. Complete details are given in FPC's bulletins P-30 and P-31. Once the magnitude of future power demands were determined, it was easy to establish the total capacity that will be required. It was only necessary to decide on a margin of reserve. Current reserves of 11 to 12 percent were increased to 15% for the year 1980.

HOME OWNERS ARE USING MORE ELECTRIC POWER



(Average Annual Kwhr per Customer)

Year								Kwhr per Customer
1950						0		1,830
1951								2,004
1952								2,169
1953								2,346
1954								2,549
1955							۰	2,751
1956								2,969
1957			0	٠				3,174

Source: Edison Electric Institute

AND ELECTRIC POWER CONSUMPTION IS INCREASING

(Millions of Kilowatt-Hours)

Year	Total for U. S.	Kwhr per Person
1950	388,674	2,582
1951	433,358	2,840
1952	463,055	2,987
1953	514,169	3,260
1954	544,645	3,394
1955	629,010	3,853
1956	684,804	4,121
1957	715,706*	4,223*

*Preliminary
Source: Edison Electric Institute

SIZE AND GROWTH OF ELECTRICAL MANUFACTURING INDUSTRY

Total Value of Shipments, Including **Exports and Interplant Transfers**

CAATES	ions	-4	D-I	11

Electrical Products	1955	1956	1957	1958 Est.*	47500
Appliances	\$4,675.8	\$4,558.9	\$4,194.2	\$4,450.0	(B)
Illuminating Equipment	737.8	855.8	898.6	953.0	1
Signal and Communication Equipment	1,260.0	1,234.8	1,345.9	1,280.0	
Industrial Apparatus	2,432.6	3,089.4	3,234.9	3,150.0	
Building Equipment and Supplies	590.1	714.0	685.4	692.0	
Insulating Materials.,	334.2	354.3	347.2	344.0	
Insulated Wire and Cable	1,483.0	1,838.9	1,507.9	1,508.0	
Generation, Transmission and Distri-					
bution Equipment	1,630.0	2,086.4	2,441.1	2,490.0	
Other Electrical Products	4,441.0	5,841.4	6,218.4	6,233.0	
Total, Industry	\$17,584.5	\$20,573.9	\$20,882.6	\$21,100.0	
*1058 Estimate as of December 1057					



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Source: National Electrical Manufacturers Association, Statistical Department

dicate that the number of hours worked per week are again on the increase, covering all workers. No doubt this holds true for electrical workers. Average weekly earnings stood at \$132.97 for electrical workers in April, down only slightly from the record \$135.49 of last October, 1957. Average hourly earnings in April were at an alltime high of \$3.49 and a BLS report just released shows a new high of \$3.50 for May.

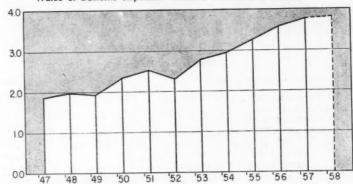
Electric Power

Electric utility companies of necessity build new generating capacity based on a long range program. Expansion plans are geared to carefully calculated growth trends of all types of utilization devices, and of energy consumption rates of all types of consumers. Thus the growth of new generating capacity installed each year is an excellent indicator of total electrical industry growth. The nation's total of 82,850,000 kilowatts of electric generating capacity in 1950 will have doubled, approximately, by the end of this year, over a period of only eight years.

The Federal Power Commission recently released a report covering projections of the electric power requirements and supply for the nation, up to 1980. Based on this report, estimated installed generating capacity in 1980 will be 422.5 million kw, or an added increase of 276.8 million kw over the next 23 years. Electric power output, currently running at an average of

Recent reports from BLS also inELECTRIC LAMP SALES REFLECT GROWTH OF ELECTRIC LIGHTING

(Value of Domestic Shipments-Hundred Thousands of Dollars)



Sources Census Bureau, Dept. of Commerce

INCANDESCENT LAMPS REMAIN POPULAR

(1957 Value of Domestic Shipments of Popular Types of Electric Lamps Used for Providing General Illumination)

(Value in Thousands of Dollars)	
Types of Lamps	Value
Large incondescent—total	158,813
General lighting, 150-watt and below	76,341
General lighting, above 150-watt	17,337
3-light lamps	7,762
Reflector lamps	17,771
Infrared heat lamps	2,259
Traffic and street lighting	5,149
Rough and vibration service lamps	4,975
All other (special purpose).	27,219
Fluorescent, hot cathode, total	81,371
Slimline	25,575
Circular	6,167
Rapid starting	11,807
Other fluorescent lamps, total	37,822
Below 40-watt	10,303
40-watt and over	27,519
Mercury lamps, total	8,957

Source: Census Bureau, Dept. of Commerce



ANNUAL STATISTICAL SUMMARY

about 720 billion kwhr annually, will nearly treble by 1980. FRP's estimate of demand for 1980 is 1,866.4 billion kwhr.

The rate of growth of kwhr consumption of electric power by home owners reflects the growing acceptance of electric living, and the need for more and better electrical wiring in the new homes now being built. In 1950, kwhr consumption per customer was 1,830, and in 1958 it will average out at about 3,500 kwhr, nearly double in eight years.

Still another indicator is the "per capita" consumption of kwhr for all power generated, which has increased from 2,582 kwhr per person in 1950 to approximately 4,300 kwhr (estimated) for 1958.

Electrical Products

Electrical machinery and equipment orders experienced a mild pickup in the second quarter of this year, and sales are expected to return to their normal growth pattern by early in 1959. Electrical appliance sales dropped beginning in 1956, declined still more in 1957, and are expected to pick up slowly as homebuilding gains are made in the months ahead.

Electric lamp sales show a consistent growth pattern since 1947, with a slight decline in only one year—1952 (under production controls during the Korean war). Sales doubled during the ten-year period. Analysis of lamp sales during 1957 show that incandescent lamp sales are nearly double that of fluorescent lamps, and that fluorescent lamps outsell mercury lamps about 9 to 1 in dollar volume.

Lighting equipment sales continue to make gains, and will increase in 1958 over 1957 by nearly 3%, according to a recent estimate by Electrical Construction and Maintenance. As the national economy returns to its normal growth, the annual rate of increase for lighting equipment is expected to jump to some 9% to 12%. Modernization work will account for about half of this increase.

Inflation

Overall, both short range and long range, prospects for continued growth in the electrical industry are good. New construction activity is expected to maintain its present high rate, with small annual increases of at least 4% to 5% for the foreseeable future. Modernization work, another electrical market indicator, should continue at an even greater growth rate. In addition, greater emphasis will be placed on automation, and this means greater use of electrical control devices and related work.

One factor to be watched, however, by the electrical industry as well as by business generally, is the inflationary trend. Inflation has already devaluated the 1947 dollar by over one-third, in a period of 11 years. With production costs continuously increasing, primarily due to labor cost increases, and with the Federal government facing deficits of \$10 to \$12 billion this year due to greater spending and smaller tax revenues, the inflation threat is greater than ever. While this problem is under study by both Government and industry, no solutions seem to be in sight. It is a problem to be considered seriously by the electrical industry as it plans its activities for the year ahead.

1958 LIGHTING EQUIPMENT DOLLAR VOLUME

(Used for General Lighting Purposes)*

(Thousands of Dollars)

ype of Construction Where Used	Value
otal new construction	462,963
Private construction	330,467
Residential (non-farm)	65,265
Nonresidential building	248,410
Industrial	77,140
Offices, warehouses and loft buildings	72,000
Stores, restaurants and garages	49,000
Other nonresidential building	50,270
Religious	
Educational	11,000
Hospital and institutional	12,750
Social and recreational	5,670
Miscellaneous	3,000
Farm construction	2,000
Public utilities	14,720
Railroad	450
Telephone and telegraph	3,770
Other public utility	10,500
All other private	
Public construction	132,496
Residential	
Nonresidential building	
Industrial	5,490
Educational	
Hospital and institutional	
Other nonresidential building	13,360
Military facilities	
Sewer and water systems	
Miscellaneous public service enterprises	
Conservation and development	
All other public	13
Highway (including streets)	
Modernization	
Total Lighting dollar volume	

^{*}Does not include searchlights, automotive, aircraft or railway coach lighting, residential portable lamps and similar types of lighting equipment not associated with building construction.

Source EC&M. (Based on EC&M Estimate for 1958 New Construction.)

NOON SUNLIGHT is simulated in intensity and spectral quality in this 24 sq ft sunshine test cabinet, now in use by Eastman Kodak Company for testing photographic film and film products. Fluorescent and incandescent lamps produce total light output of 371,600 lumens, consume total electrical load of 8320 watts.

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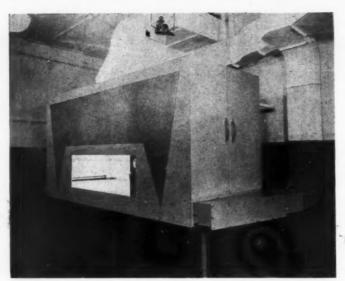
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Power Groove Lamps Provide

10,000 Footcandles for Sunlight Tests

Eastman Kodak Company solves need for noon sunlight quality and intensity illumination with sunlight test cabinet which produces 10,000 footcandles with continuously available and controllable electric light sources.

ONTROLLED illumination of noon sunlight intensity and spectral characteristics is provided by electric light sources in a special sunshine test cabinet designed and installed by Eastman Kodak Company, Rochester, N. Y. Average maintained intensities of between 10,000 and 11,000 footcandles of illumination are provided in this cabinet, for use in conducting controlled sunshine exposure tests and experiments on photographic films and other film products. The cabinet is used by the Quality Control Section of Kodak Park's Cine & Sheet Film Division, and makes available the controlled ultra high level illumination at all times for test work formerly carried on in natural daylight, where accuracy and uniformity were de-



SUNSHINE test cabinet is self-contained, houses all light sources and ballasts, and is kept at proper temperature inside by thermostatically controlled filtered air. Air enters cabinet at bottom of both ends of cabinet, is exhausted at top. Note access door on side in open position.

pendent upon the weather, time of day, and season of the year.

The sunshine test cabinet is made of sheet steel. It is 8 ft 4 in. long, 4 ft high, and 3 ft 2 in. wide. It is equipped with 28 F96FG17/CW General Electric Power Groove fluorescent lamps and eight 200-watt inside frost incandescent lamps. The cabinet, which houses a total connected lighting and ballast load of 8320 watts, is kept cool by forced filtered air. The air temperature is thermostatically controlled to provide uniform and near optimum conditions for maximum light output.

In order to obtain this high level illumination, the fluorescent lamps were installed as close as possible inside the cabinet along both sides and the top. To further increase the number of lamps in the cabinet, those in the top section were installed on a curved radius, and staggered (see cross section detail of cabinet). The eight incandescent lamps were installed in the center of the top, in a space running the entire length of the cabinet left for that purpose.

The top and sides of the entire interior of the cabinet were lined with polished Alzak aluminum. Reflectors at the top of the cabinet were perforated, to allow cooling air to pass through the ballast compartment, and on to the exhaust duct. The fluorescent lampholders were positioned so that the directional component of the Power Groove lamps would be utilized by directing maximum light output from each lamp to the center of the test area.

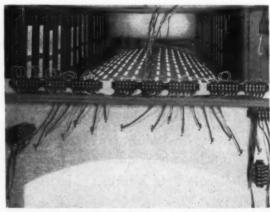
In order to duplicate as nearly as possible in the test cabinet the conditions which prevail when Kodak's customers load or otherwise handle film outdoors in brilliant sunlight, such as on a beach where light would be reflected off the sand or other bright surfaces, a special floor was installed which would simulate these conditions. It consists of a perforated aluminum sheet metal floor, with openings about 1 in. square. This perforated floor was installed about 6 in. above the bottom of the cabinet, which was also lined with polished Alzak alumi-

Ballasts were placed in a separate top compartment for easy access, and to prevent heat given off by the ballasts from affecting lamp operation.

Filtered air is introduced into the cabinet from the bottom at both ends. This air is then passed through the entire cabinet and exhausted through the top, and thence outside the building. The air is brought in to the unit from outside the building. Since this air would reduce light output of the fluorescent lamps during cold weather, it is heated to a uniform temperature of 90° F. The controlling thermo-



ILLUMINATION intensity is being checked with photographic exposure meter of direct reading (incident light) type, as film packs are placed in cabinet for testing.



BALLASTS for F96PG17/CW Power Groove fluorescent lamps are mounted vertically on sides of cabinet in ballast compartment at top of cabinet.

stat is located in the exhaust duct.

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The front of the cabinet is equipped with bi-parting sliding action doors, so that material to be tested can be inserted and handled, or it may be placed inside on the perforated platform and the doors closed for an extended period of time. A 4-in. diameter peep hole equipped with a neutral density filter is provided in these doors for observation purposes.

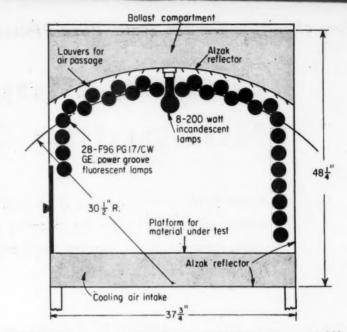
Electric power for the test cabinet, including the lamp load and air conditioning motor is supplied at 440 volts, 3-phase, 3-wire, 60 cycles, which is reduced to 120 volts through a 15-kva, 3-phase, 4-wire lighting transformer having four 2½% full capacity taps below 480 volts to allow for voltage adjustment. The lights are controlled by a single switch which operates a magnetic contactor. A small 8-circuit circuit breaker lighting panel is used to provide suitable branch circuit protection and can also be used to control groups of lights inside the cabinet.

When the cabinet was first put into operation, initial readings showed a lighting level of 14,000 footcandles. After a few months of use, it was checked again, and showed 11,000 footcandles at an operating voltage of 111 volts. Voltage was increased to 122 volts by changing to a higher tap on the transformer, which resulted in an increase of 1600 footcandles; or in other words, by increasing the voltage by 10%, the lighting intensity increased 12%.

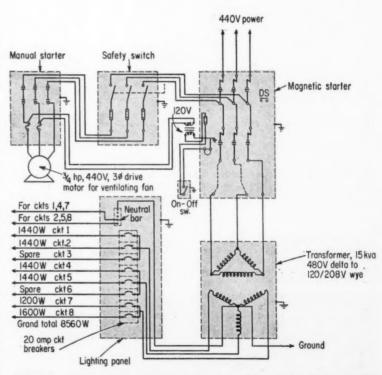
Based on the experiences with this cabinet, Eastman Kodak's engineers believe that a cabinet could be designed to produce a lighting level approximately twice that of natural daylight, or 20,000 footcandles, should there be need and justification to do so.

This lighting installation was awarded first prize in the Architects/Engineers Division, Industrial Lighting classification of the 1957 International Lighting Competition.

The design, construction and installation of this test cabinet and related electrical and air cooling work was coordinated by Herbert S. Glick, electrical engineer for Eastman Kodak Co., in cooperation with Eastman's production department management, and the Macbeth Corporation, Newburgh, N. Y. which was awarded the contract for making the cabinet.



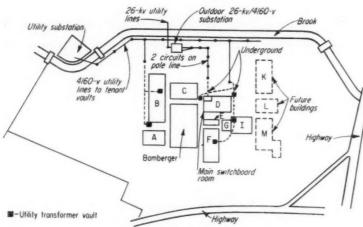
CROSS-SECTION through cabinet shows how Power Groove lamps and 200-watt inside frost incandescent lamps are spaced, and other design features. Apertures in reflectors permit uniform air circulation for keeping cabinet interior at proper temperature for optimum lighting efficiency of the fluorescent lamps.



POWER is supplied to test cabinet at 440 volts, 3-phase, 3-wire. Motor operates direct from supply at 440 volts. Lighting load of 8320 watts is served at 120/208-volts through 15 kva-transformer.

High Voltage in a Shopping Center

A dual supply system operating at two high voltage levels provides flexible, economical distribution for the extensive Garden State Plaza shopping center, Paramus, N. J. Electrical construction was done by Watson-Flagg Engineering Corp., Paterson, N. J.



BASIC PLAN of shopping center shows two supply arrangements for powering the group of buildings. Two 26-kv lines from separate utility switching stations feed the outdoor shopping center substation. From the secondary, two 4160-volt lines (each three 500MCM and one 250MCM) are carried on upper and lower gains of pole line, then underground into D building. Utility 4160-volt pole line circuits are carried underground through manholes to feed the layout of utility transformer vaults which supply all tenant loads. The underground runs of these 4160-volt circuits are made in 4-in, galvanized steel conduits laid directly in the earth up to the building exterior walls.

OUTDOOR SUBSTATION supplying shopping center proper is located at rear of shopping center. Two 26-kv utility lines come into substation on poles from left. Two 4160-volt feeder lines to basement of building D are carried on poles to a point (out of sight at left) close to the buildings where the lines are taken underground into the main switchboard.



ISTRIBUTION for light and power is based on extensive high-voltage circuiting at Garden State Plaza, Paramus, N. J. The electric supply to the large shopping center is divided into two separate but co-extensive high voltage systems. The first, and larger, system provides for operation of the owner's power and light loads throughout the center and for the largest department store in the center. The second system provides service for the individual tenants throughout the center. Overall, the distribution layout here is closely matched to the requirements of the owners and tenants. Study of the system reveals the necessity for such a layout based on metering requirements.

SYSTEM 1

The larger system at the Plaza supplies the facilities provided by the shopping center management. This includes: lighting of all public areas, corridors, rest rooms, truck tunnel under the building area, offices for the shopping center corporation and a public auditorium; lighting of the parking areas; lighting of canopies, crossover walks, telephone islands and the mall; and the power for all compressors, boilers, pumps, fans and all other equipment for cooling and heating. The system also supplies electrical loads in Bambergers, the largest department store in the area, because this store is owned by the owners of the center.

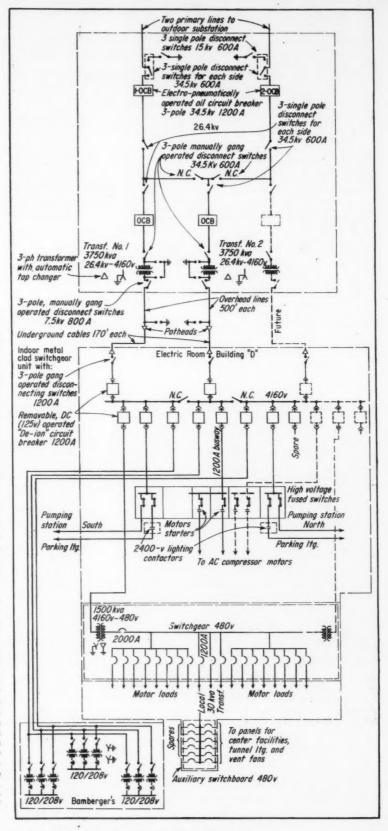
By B. F. Thomas, Jr.

Director, Electrical Division Abbott, Merkt & Company Consulting Engineers New York, N. Y.

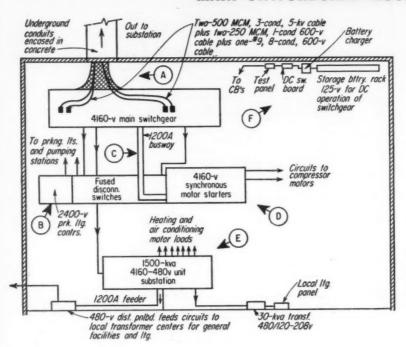
This supply system to the shopping center proper is served by two 26.4-kv utility transmission lines into an outdoor substation owned by the center. For protection against power outage in the center, these two incoming lines are fed from separate switching stations—one east and one west of the center—and are tied together at the substation.

The outdoor substation has a present capacity of 7,500 kva, with provision for an ultimate capacity of 12,500 kva. The transformers in the substation are rated 26.4-kv to 4160 volts, connected delta-wye with the secondary neutral point grounded. Each transformer is equipped on its secondary with automatic tap changers which operate under load. These are so connected that both transformers are

DISTRIBUTION SYSTEM for the shopping center proper—the owner's facilities and electrification of Bamberger's department store-is a radial type with primary and secondary selective provisions for high degree of service reliability and flexibility throughout the system. The utility supply forms a loop primary, and the combination of CB's and disconnects provides maximum protection for the transformers, the load system and the primary loop supply. This protection scheme minimizes opening of the loop and provides isolation of 26.4-kv bus faults for high service continuity through one transformer. The double-throw switches on the incoming supply lines provide for grounding of the lines for safe maintenance after de-energizing them. Only the utility has access to the equipment on the primary side of the 26.4/ 4.16-kv transformers.



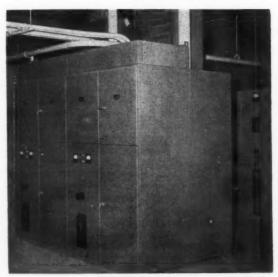
MAIN SWITCHBOARD ROOM



FLOOR PLAN of main switchboard room in basement of building "D" shows layout of major distribution equipment for electrical supply to shopping center proper and to Bamberger's department store. Circled letters correspond to letters of accompanying photos taken in the electric room. Arrowheads indicate angles at which photos were taken.



C—1200A BUSWAY connects synchronous motor starters in enclosure at right to main 4160-volt switchgear at left. Bracket supporting busway on column at center is made of channel iron sections bolted to inserts in concrete and attached by bolt to angle bracket on side of busway enclosure.



D—AUXILIARY SWITCHGEAR fed from main switchgear and operating at 4160/2400 volts, 3-phase, 4-wire, houses motor starters and high-voltage fused switches for motor disconnect and short-circuit protection, for refrigeration compressors. Each double-sized compartment contains the control and protection for one of the 2250-hp synchronous motors. The common bus which supplies the two motors is equipped with surge voltage protection for the motors, consisting of a lightning arrester and a 0.5 microfarad capacitor on each plase. Field resistors for the synchronous motors are in enclosures on top rear of compartments. Conduits running from top of compartments toward left carry exciter and field circuits for motors and control and interlock circuits to nearby 1500-kva unit substation.



A—SUPPLY CIRCUITS from outside substation come in basement through wall from 5-in, rigid conduits at right. Eight conduits run out to two poles in the overhead line from the outdoor substation. Four conduits are used; four are spare. The conduits are encased in concrete for only a few feet outside the wall. The rest of the run is direct buried to the poles. Here expanded steel cable tray supports 4160-volt circuits from end of conduits to top of main switchboard at left. Feeders rest on porcelain insulators spaced along the tray to support the conductors above the metal tray. Box above point of feeder entrance encloses four more conduit outlets which carry direct-burial feeder cables out to parking lot lighting circuits and pumping stations and control circuits out to outdoor substation.



B-MAIN 4160-VOLT SWITCHBOARD is shown here from a point on a stairway up from the floor of the room, looking over the top of the cage housing 2400-volt remote contactors for parking area lighting. On the back wall, incoming and outgoing feeders are enclosed in short conduit runs just outside the building. Supply feeders come into two main 1200amp CB's in sections at left and right. Each main CB is fed by two 500MCM, 3-conductor 5-kv cables for multiple conductor phase feeders and two 250MCM, single-conductor 600-volt cable for a multiple neutral. These cables are carried in the bottom four conduits with the four just above for spares. The two top rows of conduits in the box are for outgoing direct-burial feeders and a No. 9, 8-conductor, rubber-insulated neoprene-jacketed 600-volt cable for control and inter-connection of relays between outdoor substation and the main sections of this switchgear. Supply cables are carried in metal tray to top of switchgear. Each of four 500MCM cables is supported by a porcelain insulated clamp suspended by a rod hanger from the ceiling. Suspension provides proper angle for cable entry to potheads on top of switchgear. The use of the double-ended main switchboard is part of overall selective layout for reliability.

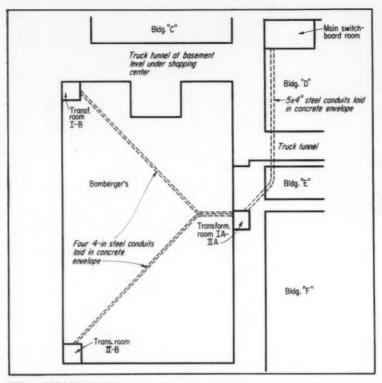


E—1500-KVA SUBSTATION is supplied from main 4160-volt switchgear cubicle by three single-conductor, No. 4, 5-kv cables in conduit (at upper right). The transformer has a 480-volt delta secondary. Main 2000-amp CB is 3-pole, magnetic air-blast type, electrically operated. One phase of the 480-volt bus is solidly grounded to provide a grounded system. Feeder CB's are similar to the main CB but are manually operated.



F—STORAGE BATTERIES are used to provide the 125 volts dc for operation of electrically controlled CB's. A 60-cell pasted plate supply is mounted on a rack. The supply has a one-minute rating of 144 amps to 1,75 volts per cell. The battery charger is an adjustable self-regulating electronic unit which maintains the battery supply fully charged at all times except when discharging under load. The open panel at center contains fused switches for protection and disconnect of dc circuits to the switchgear. At left is a dc panel for testing operation of CB's when removed from switchgear. This equipment serves an important maintenance function. A typical test setup is shown at left on one of the drawout, carriage-mounted CB's.





HIGH VOLTAGE FEEDERS are run from main switchboard room to three transformer vaults in Bamberger's basement. Concrete encased conduits carry three sets of feeder conductors below the floor slab of the buildings. Each feeder consists of one 300MCM, 3-conductor, 5000-volt, paper and lead cable in one 4-in. conduit. Each of each feeder is terminated in a suitable pothead for lead cable. To serve the wye-wye connection of transformers, a single 250MCM, uninsulated, neoprenejacketed cable is carried, as a neutral, in one of the 4-in. conduits with a feeder cable. This connects to both primary and secondary neutral points on transformers.

automatically held to a voltage which will provide a constant 121 volts at the low-voltage switchgear bus in the Bamberger transformer rooms. These tap changers provide excellent regulation of the utilization voltages.

From the outdoor substation, two 4160-volt feeder lines are carried overhead, on poles, to a point about 50 ft west of building D, at which point they go underground into the switchgear in the electric room in building D. The overhead portion of each line is made up of one 500 MCM, weatherproof cable per phase on the poles and two 500 MCM, rubber insulated, neoprene jacketed per phase underground. The neutral conductor for each feeder has one-half the cross section area of one phase conductor.

In the main switchgear room in the basement of building D, the distribution equipment for the center is concentrated. The main 4160-volt switchgear contains compartments for the two incoming supply feeders and switching and protection in compartments for the following outgoing feeders:

a. Three feeders to Bamberger's department store.

b. Two feeders for lighting the large outside parking area.

c. One feeder for miscellaneous power and light.

 d. One feeder for the refrigeration compressors.

e. One spare feeder.

Provision has been made for the future installation of a third feeder from the outdoor substation into the main 4160-volt switchgear. The main bus in the switchgear is uniform throughout and is sectionalized for convenience in working on the board. The sectionalizing also provides for a future arrangement in which each Bamberger feeder can be fed from a separate incoming line from the outdoor substation.

Power for Bamberger is supplied by three 4160-volt feeders from the main switchboard room to three

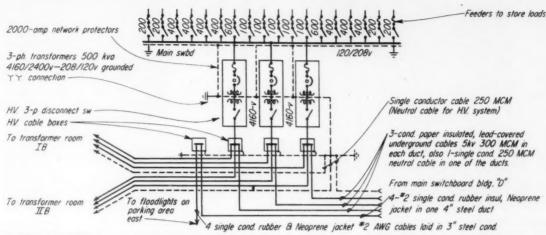
transformer rooms in the basement of the store. These rooms are located at widely separated points in the basement. Each room houses three 500-kva, 3-phase, dry-type transformers. The three feeders are run to each room. Transformer No. 1 in each room is connected to feeder No. 1. Transformer No. 2 in each room is connected to feeder No. 2. And transformer No. 3 is connected to feeder No. 3. Each transformer is rated at 4160-volt primary to 120/208-volt secondary, with the three transformer secondaries in each room connected in parallel to the low-voltage switchboard. This forms a spot network for the transformers. A 2,000-amp network protector is installed on the secondary of each transformer to prevent feedback from secondary to primary on a faulted or disconnected feeder to one or two of the transformers. Each transformer primary is connected directly to the feeder through a disconnecting switch in the transformer housing. This switch serves to isolate the the feeder transformer after breaker on the main board has been onened.

Each transformer room in Bamberger also houses a live-front, open type, fused knife-switch 120/208-volt distribution switchboard. Each board provides disconnect and protection for feeders to light and power loads in the store building.

From the main 4160-volt switch-board in building D, two feeders are derived to operate all of the outside parking lighting. This was thoroughly discussed in the previous article on Garden State Plaza (Electrical Construction and Maintenance, September 1957).

Power for heating and air conditioning equipment and for miscellaneous power and general lighting for common areas of the center is supplied from a 1500-kva, single ended, 4160/480-volt unit substation in the main switchboard room in building D. This sub is fed from the main 4160-volt switchboard by one feeder. Feeders from the substation secondary are run to a central utility plant in an adjacent area of the basement of building D where they supply pumps and boilers. The entire shopping center is cooled and heated from this plant. Chilled water and high temperature, high pressure water are pumped throughout the center. with taps taken from the mains to supply all tenants.

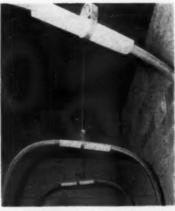
TRANSFORMER ROOM



NETWORK HOOKUP of transformers in room IA-IIA is supplied by taps from three feeders from main switchboard in building D. Transformer secondaries are paralleled on 120/208-volt switchboard bus. Feeders are spliced to continue runs to other transformer rooms. Network protectors open secondary connection in the event of power flow reversal when one of primary feeders goes out. Fuses protect individual transformers against overcurrent.



FEEDER SPLICES in three sets of feeders from main 4160-volt switchboard are made in these high-voltage cable boxes with potheads for connection of lead cables. The furthest box is used for a 4-wire, 4160/2400-volt circuit to parking lot lighting. Bamberger feeders from building "D" come in to transformer room through base of wall at right. Taps to three transformers in this room are made from tops of splice boxes. Continuations of feeder runs to two other transformer rooms are made from potheads on bottoms of splice boxes, out through concrete encased conduits at base of rear wall.



TAP LENGTHS of lead cable from splice boxes to 3-pole, 400-amp, primary disconnect switches in transformers are supported by straps on hangers from the ceiling. A half-round section of asbestos cement is inserted under the cable at each point of strap support. Transformer pothead connections are at left.



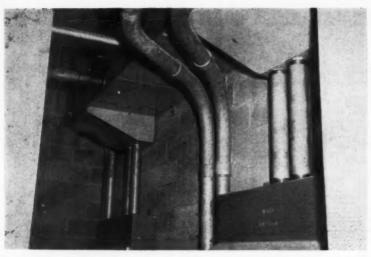
120/208-VOLT SWITCHBOARD in each transformer room is supplied from overhead by three 2000-amp, 4-wire busway runs from network protectors on the secondaries of the three transformers. Each network protector consists of a circuit breaker, operating mechanism, network relays to prevent feedback into the transformers and control equipment necessary for operation of a spot network. Each unit is rated at 2000 amps, 250 volts. The three busways are paralleled on the switchboard, which is open type with fused knife switches for feeder disconnect and protection.

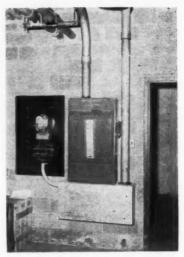
The entire cooling load at the center is carried by two refrigerating compressors in the central utility plant. Each of these compressors is rated at 2250 tons of refrigerating capacity. Each unit is powered by a 2250-hp, 100% PF, 4160-volt synchronous motor.

These are started through reduced-voltage reactor-type starters which limit starting current to 275% of the full-load value.

Lighting and small power for the center proper are supplied from a 480/277-volt distribution panel-board mounted on the wall near the

480-volt substation and fed from the sub by a 1200-amp circuit in wireway. From this distribution board, 480-volt feeders are run to electric closets in the various buildings throughout the center. In each electric closet, a 480-120/208-volt, dry-type transformer is





TENANT SERVICES are tapped from enclosed busway near ceiling in this typical meter room (left). Busways are fed from nearby utility transformer vault. Wire and conduit taps are made to main service disconnecting means. Service equipment and meter for each tenant is mounted, as shown at right, in one of the meter rooms adjoining the utility transformer vaults.

mounted alongside a lighting panelboard which it supplies.

Canopy lighting and mall lighting are divided among circuits from these outlying panelboards. Remote control of these lighting circuits is obtained through a magnetic contactor connected on the supply to the busses in each panelboard. The coil circuits of all of the contactors are run in conduit back to a special pushbutton control panel in the main switchboard room. This panel contains all of the pilot switching devices for control of all canopy, mall, crossover and parking lights from one central point.

SYSTEM 2

The second electrical distribution system at G.S.P. provides for a separately metered and billed service to each tenant in the center. From its own substation on the property, the utility company brings three 4160-volt, 3-phase lines to transformer vaults in several buildings. These lines are run overhead on wood poles up to a point about 50 ft from the buildings, where they are carried down the pole and underground. These underground runs then feed six transformer vaults to supply eight tenant buildings.

Each vault in this second system is designed for an ultimate capacity of three 750-kva, 3-phase, 4160 to 120/208-volt, wye transformers. The secondaries are bussed together through a network pro-

tector on each transformer secondary. The transformers and feeders are sized so that any two transformers and any two feeders can carry the entire anticipated load.

The secondaries of these vault transformers are tied into a heavy bus which runs from the transformer room to an adjacent meter room. In most cases, the meter room immediately adjoins the transformer vault, and the bus is carried through the wall. Where the meter room is remote from the transformer room, a cable feeder in concrete-encased conduit to the meter room is run under the floor slab set on the ground.

In each meter room, the supply bus is tapped for a service to each tenant. A main, fused disconnecting switch is used at the tap for each service feeder which runs from the meter room to a main distribution panelboard in the tenants space. Wiring of tenant space on the load side of the main panel is provided by the tenant.

THE PROJECT

The entire shopping center project for G.S.P. has been divided into four construction stages.

Stage 1—Completed as described above.

Stage 2—Under construction. Stores will open in Fall 1958. Stage 3—In preliminary design

Stage 4-Future.

stage.

At present, the load on the shop-

ping center is about 4,100 kilowatts. This peak occurred last summer, before all tenants were open for business and during a rather comfortable summer. The anticipated peak after completion of the fourth stage will be about 10,000 kw. The present tenant load is about 2,000 kw for Stage 1 of the project. This may increase to 7,000 to 8,000 kw when the project is completed.

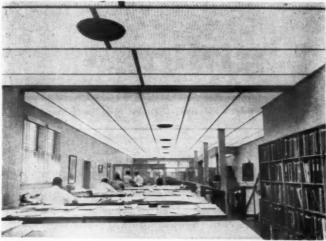
Voltage Regulation

During the period of design of Stage 1, we recognized the need for voltage regulators on the incoming electric service lines. The utility company supplies the electricity to the Shopping Center at 26,400 volts, unregulated. This means that the voltage might vary up to 10% above or below this value. At a lamp outlet this would mean a variation from 108 to 132 volts, whereas the proper voltage should be 120 volts. Actual figures on the variation were from 115 to 129 volts. This range of voltage is too great for satisfactory lighting.

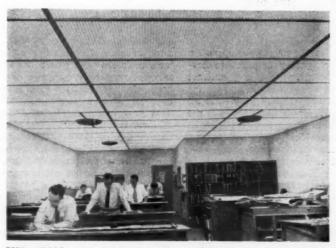
In order to correct the voltage fluctuation, automatic tap-changers for operation under load were installed on the secondary side of the 3750-kva transformers in the outdoor substation. After operation began last summer, these tap-changers were adjusted to maintain 121 volts on the low-voltage bus bars in the transformer rooms in Bamberger's Department Store. Variations from this value of voltage do not exceed ±1%.

Newbery Electric Relights

West Coast electrical contractor installs luminous ceiling in two large engineering areas, where visual tasks are severe, and comfortable lighting is important.



ENGINEERING and drafting area of Newbery Electric Company's Los Angeles office is now lighted to an intensity of 135 footcandles by new Wakon luminous ceiling. Area is also air conditioned, and air outlets fit snugly under plastic ceiling light diffuser panels.



ESTIMATORS and engineers in smaller area also work in an ideal visual environment where lighting intensity is a comfortable 135 footcandles provided by the low-brightness luminous ceiling consisting of fluorescent lamps installed on wiring channels above the corrugated plastic ceiling.

NE of the nation's largest electrical contractors, Newbery Electric Company, believes in the old adage, "Practice what you preach". In other words, this company has recently relighted two of the areas of major importance in its headquarter offices in Los Angeles. One is the 1470 sq ft engineering and estimating area, and the other is the 2,013 sq ft engineering and drafting area, both of which require good quality eye-comfort illumination for maximum ease in seeing over prolonged periods of time. The new lighting is comparable in all respects to that being sold and installed in the hundreds of projects which they do annually.

The lighting system selected for each of these important work areas was the Wakefield Wakon luminous ceiling system, installed wall-towall in each area. This system, which provides in excess of 100 footcandles economically, consists essentially of corrugated plastic diffuser panels 36 ins. wide, supported on T-bars, at a height of approximately 81 ft above the floor, above which 96T12 fluorescent lamps are supported on continuous wireway channels, spaced 18 ins. on centers, and approximately 12 ins. above the diffusers. The plenum cavity above the diffusers is painted flat white throughout.

The initial lighting intensity, when the installation and lamps were new, averaged 135 footcandles throughout. The area is air conditioned, and it is expected that the in-service intensity will maintain at 100 footcandles and above with normal maintenance.

The engineers, estimators and draftsmen who work under this new lighting are highly pleased with its eye-comfort qualities and the low-brightness appearance.





ROLLING EQUIPMENT consists of three trucks and trailermounted washing machine. Two service trucks and washer (left) are used exclusively for lighting maintenance work.

A one-ton truck with walk-in type body (right), is used for minor electrical construction and repair work. A standard passenger car is used for sales work.

Florida Contractor Finds

Special Lighting Maintenance Tools

Cut Costs, Help Sell Contracts

Fluorescent Service Corporation, Tampa, Fla., keeps lighting maintenance contract rates minimum, and customer satisfaction maximum, by using special tools and equipment to cut individual job cost, keep overhead down. New washing machine, custom designed and made locally, and special labor-saving truck bodies, are typical examples.



PARTNERS who own and operate Fluorescent Service Corporation, Tampa, Fla., are Ed Davis (left) and Malger H. Gray, president.

A EY to the successful operation of a lighting maintenance service company is to keep contract rates as low as possible, and to give prompt and efficient service to all customers at all times. This is the conclusion reached by Malger H. Gray, president, and W. Ed Davis, partners, who own and operate the Fluorescent Service Corporation, in Tampa, Fla., established over 11 years ago, in May 1947.

Fluorescent Service Corporation sells its services and maintains lighting systems in commercial, industrial and institutional establishments in the Tampa-St. Petersburg-Clearwater triangle area on the Western coast of Florida.

In order to maintain reasonable

contract rates for lighting maintenance (a low selling price for the services rendered) company overhead and individual job costs must be kept at a minimum, in Mr. Gray's opinion. Fluorescent Service achieves this through the use of all time and labor-saving devices and equipment possible, and by closely correlating capital expenditures to the total amount of maintenance work under contract. Since lighting maintenance contracts are usually signed on a two-year basis, it is relatively easy to keep capital spending closely geared to company sales growth.

Lighting maintenance work accounts for about 90% of Fluorescent Service's gross dollar volume. The remaining 10% is in electrical Truck Bodies Are Custom-Made construction and repair work-additional lighting, wiring, etc.which results from lighting maintenance customer contacts.

Maintenance contracts are made for all types of lighting installations, indoor and outdoor, fluorescent, incandescent and mercury vapor. Contracts cover the furnishing and installing of new lamps. miscellaneous repairs of lighting units, ballast replacements, and washing of all fixtures, including labor, materials, ladders, and special equipment as required for servicing. Contracts vary in size from \$3.00 to \$900.00 monthly; however, the average contract on typical commercial stores, offices, etc. varies from about \$15.00 to \$50.00 per month

Overhead is currently comprised of an office and shop, warehouse, four trucks, new lighting equipment washer, and all ladders, meters, tools, etc. as required. Three 1-ton service trucks are used exclusively for lighting maintenance work, two with special bodies equipped to carry all tools and supplies needed for servicing the typical lighting installation, and one as an all-purpose unit used to deliver additional materials, etc. as may be required. The fourth truck is a one-ton model with walk-in panel, used exclusively for electrical construction work. A standard passenger car is used for sales work.

Personnel currently consists of six regular production employees, and a salesman, in addition to Mr. Gray and a secretary. Ed Davis, partner, supervises maintenance production as well as handling all electrical work.

Contract pricing for maintenance is done on a sliding scale basis. Job is first surveyed to determine the number and types of luminaires, the number and type of light sources used, accessibility to premises and to lighting equipment, availability (daytime, night, holidays). Taking all these factors into account, the job is analyzed and priced, based on historical experiences on similar projects. Fixture washing may be done on an annual basis, or any shorter period, as indicated by the dirt condition of the premises and agreed to by client.

Group relamping is done on all except the smaller jobs that are readily available and accessible. New lamps are installed in all luminaires when the contract is



TRUCK BODY is steel frame aluminum cover construction, six feet wide. Open section on right is four feet deep, used for storage of incandescent and mercury vapor lamps, small (15-, 20-, 30-watt) fluorescents; also ballasts in compartment adjacent to body cab. All trucks, including washing machine, are painted white, with black trim.



COMPARTMENT on driver's side (open) is 12 inches deep, and is used to store miscellaneous sockets, fixture switches, starters, etc., as well as instruments, flashlight, small tools. Extension ladder (on top of truck, left side) is held in place by hinged flat iron strap, which also holds ladder in place for extended upright position.



MAIN STORAGE of body opens to rear (shown). Top compartment (open) holds nine cases of 40-watt (48 in.) lamps. Long (72 in. and 96 in.) lamps are stored in box on top of truck (center). Two steel cups welded to body frame (above bumper) hold foot of extension ladder for upright position.

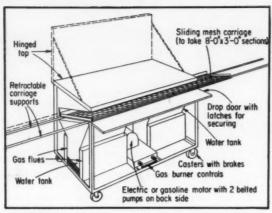
EXTENSION LADDER in operating position extends from 15 feet high (unsupported) to a 28-foot height, when supported against a floodlight pole, or otherwise. Other ladders include 10foot and 6-foot magnesium ladders.



signed, and interim replacements then made as lamps become defective, until period for complete replacement of all lamps is reached. All old lamps are destroyed when removed from luminaires to prevent their reuse.

New business is solicited through personal calls by Gray and the salesman, and by continuous direct mail. About 50 direct mail pieces are mailed out daily to a selected mailing list of 1500 prospective customers. Then a new mailing piece is used, and mailings repeated to the same list. Different series of mailers are used, especially prepared for this purpose. The most valuable new contracts result from references of regular customers, according to Mr. Gray.

A special sales binder has been prepared for use with prospects. It contains pictures of installations under contract, of trucks and equipment used in servicing accounts, testimonials, list of customers by types, leaflets describing the bene-



FEATURES of the lighting equipment washer are shown by this preliminary sketch. Minor detail changes were incorporated in the final design, during the time of actual construction of the machine.



WASHER is mounted on trailer rather than casters, for easier portability. Trailer attaches to truck with typical heavy duty trailer tie, and automatically locks on tie ball. Total weight of washer and trailer is about 2000 lbs.

fits of proper maintenance, a specimen contract form, and similar selling aids. The salesman also carries a light meter, footcandle estimator scale, and literature describing typical lighting principles and benefits.

Office Procedures

Bookkeeping and billing has been simplified so that it requires a minimum of paper work. Statements are mailed out monthly. These are prepared from a set of master record forms, one for each contract. Each form gives customer's name and address, contract date, cleaning dates, and rate. In

addition, this form lists all fixtures, ballasts, lamps and starters, and has space for listing all replacements of lamps, ballasts, starters, and miscellaneous, as well as labor and dates for checking, cleaning, and service. At end of each year, space provided permits listing of total income, labor for checking, cleaning, and service, material, and total cost. Net for this account can thus be calculated quickly, and also listed. Simple work sheet and fixture cleaning work order forms are used, which have space for listing of employees' names and time record, customer's name and address, special instructions, number of fixtures cleaned, etc. Information is

transferred from these work sheets to master record forms monthly, thus a perpetual record is available on each contract account at all times.

Luminaire Washer

The major problem faced by this firm up until recently was how to reduce labor costs in washing and cleaning luminaires. Dip tanks and brushes were used formerly. But these proved cumbersome, and time consuming, and heating of water, drying of equipment and similar problems were costly.

This problem was effectively solved by partners Gray and Davis.

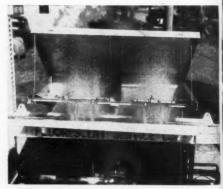
Washer Construction Features



OPERATING side of washer has platform along entire side of machine, which folds up for traveling from one job to anoher. Gas engine (center) is 134 hp, drives two water pumps to provide pressure for spray nozzles. Two sets of spray nozzles are used, one set above and one set below sliding carriage.



REAR of washer shows two water pumps, V-belt drive from engine, and two water tanks. Each tank holds 20 gallons of water, which is heated by two 60,000 Btu gas burners, (not shown—located under tanks) using LP gas. Capacity of pumps is 90 gal/min., with 2 in. inlet and 2 in. discharge for each tank.



WATER SPRAY comes from two sets of nozzles, onc set above and one set below the carriage which holds the lighting equipment to be cleaned. Tank at right contains detergent, tank at left holds rinse water. Baffles in center of lid (shown open) prevent mixing of water from the two tanks.

Cleaning Corrugated Vinyl



VINYL plastic is threaded through the washer, with front lid down, and attached to free roller at exit end. Roller is then turned to pull plastic through machine at normal rate as required for thorough cleaning.



CARRIAGE is at angle of about 30 degrees, to provide water drainage during cleaning operation. Operator removes reroll from cleaned roll of plastic, as second operator has second roll ready for attaching. Note spray in rinsing tank.



DIFFUSER rolls are stood on end over wood dowel pins mounted on simple 1 in. by 14 in. board for draining dry. Wetting agent used in rinse water speeds this operation. Reroll is of collapsible type, to prevent damage to plastic.

They visited George Zipfel, vice president of Morrison Engineering Corp. in Tampa, and outlined their problem. Together they designed and worked out the details for a completely new type of washer which will wash and rinse all types of lighting equipment diffusers, louvers, and reflectors. The machine was then custom built, and is now in operation.

This new washer is a self-contained unit, and is trailer-mounted for readily moving from one job to another. It consists of two 20-gallon water tanks, two LP gas burners for heating the water, a gasoline engine, two water pumps, two sets of spray nozzles, a sliding mesh carriage on retractable carriage supports, a housing, and a fold-up type working platform. A threewheel trailer frame serves as the frame support for the entire unit. which weighs about 2000 lbs total. It is attached to either of the lighting maintenance service trucks for towing by means of a standard trailer tie.

In operation, the luminaire washer is towed to the premises of the customer and parked near a service entrance, or at the curb. It is filled with water by hose, burners are turned on until water is heated, gas engine is started, and the washer is ready for use. Diffusers, louvers, reflectors and parts to be washed are removed from the luminaires, stacked on dollies, and rolled to the washer.

In cleaning plastic diffusers,

either vinyl or acrylic, corrugated or formed panels, other washers on the market use brushes for cleaning. Use of brushes, it has been found, sets up electrostatic charges which contribute to fast accumulation of dust and dirt when the diffusers are reinstalled in the luminaires. By using spray nozzles in the new tank, this electrostatic charge is eliminated, and the luminaires remain cleaner for a much longer period of time. A special cleaning detergent is used in the first tank in the washer, and a special wetting agent is added to the rinse water. Baffles between the tanks prevent water from one tank splashing into the other tank. Various materials to be washed are placed on the sliding carriage and fed through the machine manually. Rate of speed is gauged according to the dirt accumulation. Standard 4-ft louvers or reflectors require about 20 seconds to go through the washer. Corrugated plastic is fed through at the rate of approximately 28 ft per minute. Additional time is required for put-on and take-off of equipment.

With the older methods of washing, the quality of the work was

DIFFUSER of corrugated vinyl plastic is removed from ceiling of Tampa Electric building for cleaning, by Earl Smith of the cleaning crew. Scaffold is a caster-equipped Baker-Roose rolling type which straddles desks and furniture. Diffuser is rolled into bundle as it is pulled through its T-bar track.



LARGEST BUILDING under contract with Fluorescent Service Corp., for lighting maintenance is Tampa Electric Co's. modern 2-year-old main office building, which contains 31,493 sq ft of corrugated vinyl luminous ceiling. Shown above is a section immediately after cleaning, and (below) a section before cleaning.



Washer Handles All Types of Lighting Equipment



RIGID PLASTIC panels of 2 ft by 4 ft size roll off carriage after coming through washer. Panels up to 4 ft by 8 ft can be cleaned by running through machine twice, with front cover open.



LOUVERS of plastic or metal are quickly and efficiently cleaned without use of brushes. Carriage holds up to six 1 by 4 louver panels at one time. Original whiteness of plastic louvers is restored.



INDUSTRIAL REFLECTORS either with or without apertures are easily handled in this washer. Carriage will hold two 96-in. units or four 48-in. reflectors at one loading.

inferior, or "spotty". Even with care, one unit might be clean, the next one, less clean. Use of 8-ft louvers and diffusers also meant the use of 8-ft tanks, which were bulky and difficult to transport. Another problem was that many customers did not have hot water available.

The new washer solves all these problems. It is readily portable. It produces its own hot water. It will wash all types of equipment, in all sizes currently in production. It does not damage louvers or plastic diffusers. And it does a high quality uniform cleaning job on each piece of equipment, cutting costs and proving economical for the dollar volume of service work it will handle.

In cleaning the lighting equipment for many of the "downtown" customers, it is necessary to park the washer at the curb. This has proved a valuable asset from an advertising standpoint. Passersby are curious, and stop to watch operations. Some new accounts have resulted from seeing this machine in use.

Incandescent and mercury vapor units are hand washed without removing them from their outlets.

Fluorescent Service Corporation paints all its trucks, including the washer, in black and white, with the main body in white. Red and blue lettering is used for company name and promotion. This helps sell and promote the business, reflects cleanliness.

The company's largest account is the modern new office building, and adjacent service station and residential display house of the Tampa Electric Company, a privatelyowned electric utility in Tampa. The office building contains 47,370 sq ft of floor area, with 31,493 sq ft of luminous ceiling. The remaining area is lighted with a variety of types of lighting equipment selected to represent as many types as possible. There are a total of 5181 fluorescent lamps, totaling 3.9 miles in length, 710 incandescent lamps, and 36 mercury vapor lamps on this job.

Housekeeping in this building is exceptional, far above average. Brooms are never used, and all dust and litter is removed from the building daily. The building is air conditioned, and has an electrostatic filter system to further reduce and eliminate dust and dirt accumulation. The building was occupied initially in November 1956, and ac-

(Continued on page 209)

TEST BOARD is set up in Company's shop, and used for checking out faults in fluor-escent lamps, ballasts, starters, lampholders, etc.

Effect of Cleaning and Relamping a Lighting System

(Office Building of Tampa Electric Company)

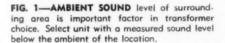
	Second Floor		
	First Floor	General Ex Office Area	ecutive Area
Initial Footcandles (November 1956) Footcandles Before Cleaning and Relamping	91	95	122
(March 1958)	73	80	104
Percent Decrease	20%	15%	14%
Footcandles* After Cleaning and Relamping			
(May 1958)	80	85	119
Percent Increase	10%	6%	14%
*Compensates for 6% increase in lumen ou	tput of	new lamps	used in

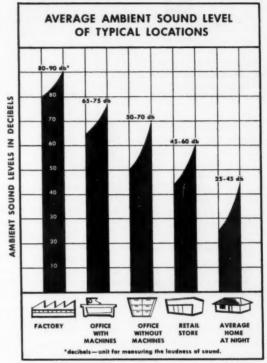
NOTE—During the above 18-month period, fluorescent lamps averaged 7663 burning hours per lamp. A total of 601 lamps, or 11%, burned out during this period. Tampa Electric Company's building is completely air conditioned, and a rigid cleaning schedule is followed, which should keep dirt collection on the lighting equipment at a very low level.

Transformer Noise— Its Origin and Control

A basic explanation of why transformers hum, plus some practical methods of minimizing objectionable noise levels of dry type transformer.

By D. R. Kearns,
Engineer, Specialty Transformer Dept.,
General Electric Company, Fort Wayne, Ind





LOCATIONS

GROWING tendency to locate equipment close to people both A at work and at home has brought about an increasing demand for quieter apparatus and appliances. Because of their location in relatively low noise areas in proximity of people, dry type transformers have been susceptible to this demand. As a result, considerable effort has been expended toward development and marketing of quieter units. This discussion of dry type transformer noise and its control is intended to help users of these transformers realize full benefits of their inherent low noise levels.

A transformer is a noise source primarily because it involves the forces of electromagnetism. These forces are very large in the transformer magnetic steel core, imparting motion to the core as a unit structure and to individual laminations composing the core. The core thus becomes the only significant vibration source in the transformer. The frequencies of these forces and resultant vibrations are the even harmonics of the alternating voltage applied. Therefore, noise emanating from a 60-cycle transformer will be at 120, 240, 360, 480, etc. cycles per second. These frequencies are quite low within the audible range of 10 to 15,000 cycles.

Vibration which originates in the core travels throughout the many component parts of the transformer and produces noise wherever it goes. In addition to the core itself, case panels and coils are principal *noise* sources in a dry type transformer.

The amount of noise produced by a component part of the transformer assembly depends on the size of its surface area, and the mode and amplitude of vibration. Although vibration produced in the core must travel through coil spacers and several structural members to get to the coils and case, these intermediate parts are usually insignificant as noise producers because of their small area. A supporting structural angle may have a high degree of vibration but produce little noise, whereas a case panel may have less motion but originate a high amplitude of noise, true in the typical transformer.

The mode and amplitude of vibration of case parts and coils are directly dependent on the resonance characteristics of those parts. A case panel which has a resonant mode of vibration close to one of the core vibration frequencies will have high relative motion and generate high noise. Such resonant conditions usually cause case and coil noise to predominate over core noise in a cased (totally enclosed) dry type transformer.

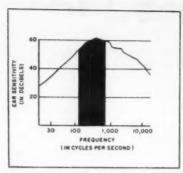


FIG. 2—EAR SENSITIVITY to noise level at various frequencies. Solid bar shows range of transformer noise.

FIG. 3—CUTAWAY VIEW of dry type transformer's main components which generate and transmit familiar "hum".



FIG. 4—EXPOSED CORE design of "quiet" transformers minimizes addition of case and coil noise to basic core hum.

Core noise predominates in transformers of exposed core design (Fig. 4) with relatively small exposed fabricated parts and with completely enclosed coils. The fact that case and coil noise are not added to basic core noise in this type of unit is a major reason for its inherently quiet operation.

Noise Characteristics

The very nature of the sound produced by transformers increases the probability of its annoying an unwilling listener. Three characteristics that make it more bothersome than other ambient noises in an office or factory are loudness, degree of continuity, and frequency spectrum.

Loudness, the most common measure of sound and usually the disturbing characteristic of a noise, is a measurement of the amplitude of a sound as made by the human measuring system. The decibel level, frequently specified for transformers and other equipment, is a loudness indicator. Another acoustic unit, the sone, is a direct loudness measure. It may be interesting to note that an eight to ten decibel increase in noise level is required to cause a transformer to sound twice as loud.

Degree of continuity refers to

variation of the amplitude of noise with time. Some examples will illustrate differences that are encountered in this characteristic. Typewriter noise is irregular in amplitude and intermittent, with unequal time intervals between sound pulses. Punch press noise is regular in amplitude and intermittent, usually with equal time intervals between pulses. Transformer noise is regular in amplitude and continuous in time. Hence the term "hum", a type of noise which people find more annoying than a discontinuous sound. A transformer, to be acceptable, must have a lower absolute sound level than a typewriter, punch press, or other producer of similar type noise.

The number of frequency components present in transformer noise is measured by a frequency spectrum. Properties of such a spectrum have an important bearing on why transformer sound is objectionable. Compare it with fan noise which contrasts in frequency characteristics with that produced by a transformer. It is a "soft" or "white" noise of many frequency components, a whirring sound which seems to fade into the background of one's thoughts. Transformers generate a "hard" noise, consisting of a few discrete frequency components - a hum

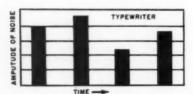
which tends to remain in the foreground of thoughts. Hence the higher annoyance factor for transformer noise. Acoustically this point is made when it is said that noise of discrete frequency components is difficult to mask or drown out.

Association of benefits is another listener consideration. People have been conditioned by experience to mentally link a benefit of heating or cooling with the noise of a fan. Since their tolerance is increased as a result of that association, the brink of annoyance is raised a few decibels. Unfortunately, most individuals link no direct benefit with transformer hum.

The combination of noise continuity, "hard" frequency characteristics, and lack of associated benefits requires that transformers have a relatively low noise level to be acceptable.

Judging Noise Level

In many applications transformer noise is masked by ambient noise, such as generated by heavy machinery or normal activity of a group of people. It is important to check transformer noise level under usual working conditions for such noise may appear objectionable during a preopening inspection



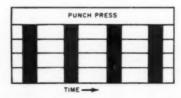




FIG. 5—VISUAL COMPARISON showing the amplitude and time characteristics of intermittent typewriter and punch press noise in relation to the continuous hum of a transformer.

and become inaudible during normal daily operation.

Degree of structural completion is another consideration. Frequently, a transformer is connected and energized before the structure housing it is completed. Unfinished sections of wall or floor, or small holes around piping or conduit can transmit enough sound to significantly raise the noise level in adjoining rooms and hallways. Final judgment should be made only after the full sound attenuation of the structure is realized.

Measuring Noise

The transformer manufacturer can reduce only the inherent noise level of the transformer itself. Measurement of this level should be made in an anechoic chamber—an enclosure which supports a sound field pattern nearly that of a free field with negligible reflection from the walls, ceiling, floor or any object within the room. Such a measurement provides a true basis of sound level comparison, unaffected by extraneous objects.

The noise level measured in an anechoic chamber is not the same as that determined in a normal installation. No usual structure would have the nearly perfect sound absorption of the chamber. However, knowing the chamber-measured noise level, and the acoustic characteristics of the transformer room, an acoustical consultant can predict closely the resultant level after installation. The transformer purchaser should be sure that quoted noise levels are those measured in such an anechoic chamber to be certain of accurate and fair comparison.

Minimizing Noise

Full sound attenuation of installed transformers—even the low noise level type—depends on control of three phenomena: vibration transmission, sound reflection, and sound directivity. Of these, vibration transmission is frequently the most critical and the easiest to control.

VIBRATION TRANSMISSION

In most applications, vibration transmitted from the transformer to parts of the enclosure will not cause unacceptable noise when standard installation methods are used. However, this may not be true in such very low noise level areas as library reading rooms, quiet offices with desk workers close by, or relatively quiet commercial shops. In such locations, watch for two symptoms that may indicate noise is being added as a result of excessive vibration transmission:

1. The existence of unusually high noise level in a room adjoining or beneath an installed unit.

2. The reaction that sound is emanating from whole walls or other parts of the building rather than from the transformer itself.

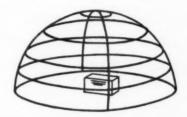
When this occurs, noise actually may be generated in parts of the building. Vibratory motion, generated in the magnetic steel core, is travelling through the transformer mounting to beams, floor, wall or mounting brackets. The resultant motion of these large building areas can add many decibels to the noise level in a room.

Two methods which can be used to reduce or eliminate this added noise are: serts. Commercially available vibration mounts accomplish this. Specialized technical guidance in selection and application should be sought. Frequency of vibration and weight of transformer are primary considerations in selecting a suitable mount, and the percent static deflection is a good measure of its effectiveness.

The use of flexible couplings (neoprene) and flexible conductors to isolate wiring troughs and conduits from the transformer unit help prevent transmission of vibration noise through the raceway system to other equipment and structural members.

SOUND REFLECTION

Much of the sound which reaches a person from any noise source has been reflected at least once by some surface close by. In a typical large room, at points more than 10 ft away from a transformer under 100 kva size, nearly all sound identified with the transformer has been reflected more than once. The reflectivity characteristics of all surfaces



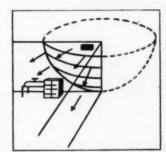


FIG. 6—LOCATION OF transformer in relatively open space (left) is best for noise control. Installation high in a ceiling corner (right) accents noise by concentrating sound in small area and reflecting it from ceiling and walls.

1. Stiffening the structural area which is vibrating. Large, unbraced areas which have a tendency to "bow" usually cause trouble because they have resonant modes of vibration at the low frequencies produced by the transformers. Excitation near such a resonant mode results in a large amount of added noise. Stiffening such an area is straight forward in principle, but hard to do unless provision for it has been made in the original plans.

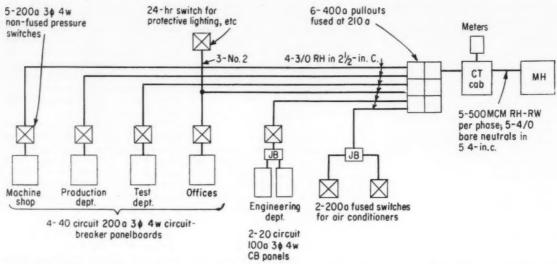
2. Isolating the transformer vibrations from the structural support. This is the simplest and most economical way to eliminate noise amplification. It means that the direct, rigid vibration path between transformer and steel structure be interrupted or broken by installing rubber, felt or other resilient in-

in such a room determine how loud that transformer sounds to the individual.

Under a free field condition all surfaces would absorb all impinging noise, the absorbency coefficient would be 1, and minimum loudness would result. A noise level produced by a nondirectional source under this ideal condition would reduce six decibels for each doubling of distance from the source.

At a more typical absorbency of 0.1 for structural materials, the noise field in the room becomes reverberant. This results in a constant level throughout the room at any distance greater than about 10 ft. Such a noise level can be reduced by increasing the absorbency. A coefficient increase from 0.1 to

(Continued on page 208)



FEEDER DISTRIBUTION from six main disconnects is by conduit to non-fused disconnecting switches and circuit breaker panels in each department.

Wiring A Small Plant

Carefully planned use of wireway, trolley busway, plug-in strip and drop cords solved feeder and branch circuit distribution problems at new plant of Panoramic Radio Co., Mt. Vernon, N. Y.

THE electrical system of the new Mt. Vernon plant of the Panoramic Radio Co. was designed and installed by William Fath, Mt. Vernon electrical contractor, for maximum flexibility to keep pace with changing production requirements. The system features judicious application of wireway, trolley busway, plug-in strip and drop cords, plus extensive use of messenger cable and shop-made beam clamps for the support of fluorescent luminaires and busway.

Except for the motor load of the machine shop, soldering irons on the assembly benches and the air conditioning system, lighting makes up the bulk of the plant's load.

The contractor's work began with the installation of a precast concrete manhole in front of the building, where utility cables were spliced to the five 500MCM RH-RW conductors per phase and five 4/0 bare neutrals in five 4-in. conduits constituting the service to the plant.

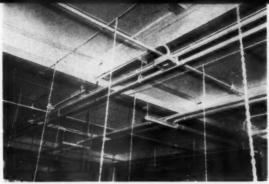
Specially fabricated busbars carry incoming current from the current transformer cabinet to the service panel containing six main 400-amp pullouts, each fused at 210 amps. These six main means of disconnect serve (1) the production department, (2) the engineering department, (3) the machine shop, (4) the test department, (5) the offices, exit and night lighting, and (6) the air conditioning equipment.

Each of the feeders to these respective departments consists of four 3/0 RH conductors in 2½-in. conduit. Unfused 3-phase, 4-wire, 200-amp pressure switches were provided as disconnects in each department as a means of killing the load each night without requiring a trip to the main distribution panel to throw the service switches. Operation of the disconnects makes it unnecessary to make detailed checks to see that all soldering units, testing devices, bench lamps, etc., are unplugged or turned off at the con-

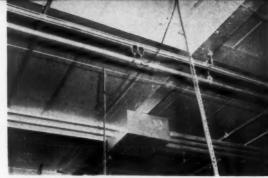
clusion of the work day.

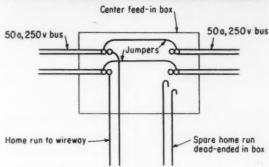
The air-conditioning feeder supplies one 15-ton and one 25-ton conditioner which cool the entire plant. Feeders to the production department, test department, machine shop and offices terminate in 40-circuit, 3-phase, 4-wire branch circuit panelboards. The two sections of the engineering department, divided by a partition, are fed by two 20-circuit panels, one on each side of the partition.

Since the circuit breaker panelboards were mounted on relatively light structural columns which were not enclosed, individual branchcircuit conduit runs from the panels to the many loads would have created difficult problems in mounting, distribution and appearance. Accordingly, 4- by 4-in. metal wireway was used to carry the circuits from the panelboards, up the columns, and along the ceiling. Circuits ware taken from the wireway as close as possible to the load.



TROLLEY DUCT feeding continuous-row bench lighting is energized through center feed-in boxes (left photo and drawing). Two-conductor bus was wired as single circuit; jumper can be removed as indicated and the additional two conductors connected to provide a separate circuit on each side of feed-in box if increased load exceeds capacity of single circuit. Busway is mounted midway between two adjacent rows of luminaires (right photo); current reaches lamps by means of 3-wire flexible rubber cord.





Production-line bench lighting, consisting of continuous-row 2-lamp luminaires mounted 6 ft above the floor and 4 ft above the surface of the benches, each housing two 96T12 slimline cool white lamps, was fed by means of trolley busway. Flexible 3-conductor cords from the fixtures terminate in 2-wire twistout plugs at the bus bars, the third

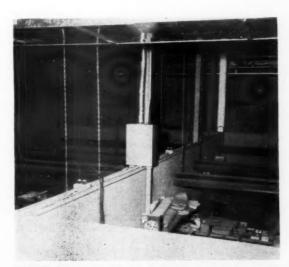
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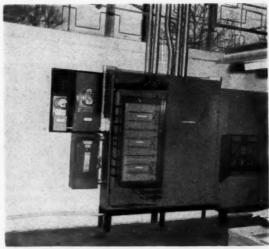
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wire being connected to a ground screw on the cord clamp of the plug. The trolley busway is fed by means of center feed-in boxes, the circuits to these boxes being carried by conduit to the panel wireway.

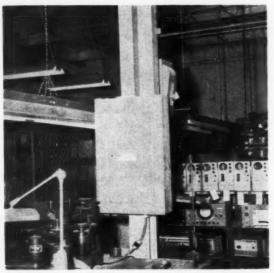
Because of occasional modifications to assembly-line benches made necessary by production changes, power for soldering irons and miscellaneous test instruments was brought to the benches by drop cord from the overhead wireway. Individual twist-lock cord connectors and caps at each bench permit the entire bench to be disconnected, eliminating the need for pilot lights to warn against energized soldering irons. Test benches, having a greater need for receptacle circuits



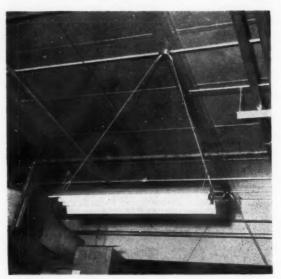
PARTITIONS were put to use in the engineering department for mounting outlet boxes feeding test bench lighting. The large junction box in the center splits the feeder; a single conduit is carried down on each side of the partition to supply the two panelboards in that department.



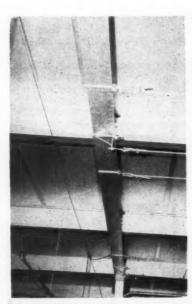
SERVICE ENTRANCE equipment, located in the engineering department, was too heavy for wall mounting. Special stands were fabricated for use beneath the panels to support the weight. Six main fused pullouts are housed in left panel; instrument transformers and bus structure are at right.



WIREWAYS carrying branch circuit conductors from panelboards eliminate problem of supporting conduits of various sizes on column.



GENERAL LIGHTING over aisles and storage areas was furnished by 2-lamp luminaires suspended by chain from ceilingmounted 4-in. round boxes.



SPECIAL BEAM CLAMPS were fabricated for terminating the messenger cable supporting the bench lighting and trolley busway, since building restrictions prohibited welding or drilling of lightweight ceiling joists. Cable terminating in the two flat clamps shown supports the continuous-row luminaires; that attached to the angle bracket in the center supports the trolley busway. The offset was necessary to bring the busway below transverse sprinkler pipes. Turnbuckles were used at opposite end of cables.



BENCH POWER for soldering irons, test instruments and portable lamps on production-department benches is brought from wireway by 3-conductor rubber-covered flexible cord. Twist-lock receptacles permit entire bench to be deenergized if necessary. Junction-box, mounted on underside of bench, would not have to be removed if a bench extension were required. Duplex receptacles are provided under bench at each girl's position for soldering irons or supplementary bench lights if required.

for meters, oscilloscopes, etc., were fitted with 3-wire multi-outlet plug-in strip the entire length of the benches.

General lighting over aisles and storage areas, consisting of individual open-bottom luminaires housing two 48T12 rapid-start coel white lamps, are fed by fixture wire run down one of the suspending chains. The fixture wire terminates in a 2-wire cap, plugged into a combination fixture-hanger and receptacle in a 4-in. round box at the ceiling. Circuit conductors are carried by conduit to the panel wireway.

Extensive welding or drilling of the relatively light ceiling steel members was not permitted, since the building was originally used as a warehouse and not designed for ceiling-supported equipment. Consequently, special beam clamps had to be designed and fabricated by the contractor to terminate the messenger cable carrying the weight of the continuous-row bench lighting and the trolley busway.

As a result of the facilities provided in excess of present requirements, sufficient service, feeder, wireway and busway capacity exists to handle any foreseeable increase in plant lighting or receptacle load.

Diamond has all



Red-D-Prene®

Neoprene Sheathed

for hot, oily locations

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Signal Yellow



for all locations where heat is no problem



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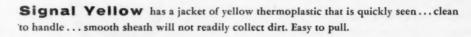
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y sof g Red-D-Prene for mill and plant use is designed with tough, oil, heat and flame resistant Type MD (Mill Duty) neoprene jacket in industrial red for ready identification.



Black Diamond has durable rubber jacket protecting against alkalies, acids and moisture. Very flexible construction prevents kinking in service.



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WIRE and CABLE Company

Sycamore, Illinois

WAREHOUSE: BIRMINGHAM, ALABAMA

ELECTRICAL CONSTRUCTION AND MAINTENANCE . . . SEPTEMBER, 1958



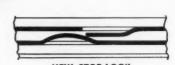
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SAVES TIME



Prevents bar from slipping apart accidentally.

Permits separation of bar if desired.

SELF-GAUGING



SERRATED NAILS ARE
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VEXTRA STRONG

RACO Adjustable Bars have been vastly improved. Note these extra advantages... pre-assembled serrated nails for easy installing... self-gauging lugs for fast positioning... friction stop-lock that prevents bars from accidentally slipping apart. High quality electro-galvanized finish. Write

today for new bulletin describing these

Ready for immediate installation. No hunting for nails.



SHALLOW OFFSET

Place gauging lug against edge of rafter or joist and nail in place.



DEEP OFFSET

Straighten gauging lug and line up flush with edge of rafter or joist.

THE ONLY BAR ON THE MARKET WITH

RIGID "M" CONSTRUCTION

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ONLY 4 BARS DO THE WORK OF 16

Simplifies stock control . . . requires less investment in inventory. Two sizes fit most every job.



superior Raco Adjustable Bars.

ALL-STEEL EQUIPMENT INC. Aurord, Illinois

Practical Methods

Industrial Television For School Use

DESIGN

ally.

Application of industrial television (ITV) as an educational tool, in contrast to the master teacher technique of studio-type closed-circuit TV, was recently demonstrated in a live experiment at the Bergenfield Junior-Senior High School. Instead of watching a regu-

lar educational TV show, the junior high students and teachers used Philco ITV equipment to transmit on-the-spot information from one part of the school to another.

In one of the teaching situations, a problem in geometry (indirect measurement of the height of the school building) was beamed via television from the school court yard to students in a second floor classroom. The other TV assignments were principles of sound in

relation to music and general art and ceramics. The miniaturized television equipment was used as an educational tool rather than as a substitute for teachers.

Another unusual feature of the experiment was two-way communications between the ITV camera and the classroom monitors. This permitted the students to interrupt the program at any time to ask questions of the teacher and students who were on camera. The camera action was stopped at various times for extended discussion of specific phases of the subjects.

Thus, the ITV camera became a searching "eye" so that the students and teachers could explore the world around them without leaving their classroom. No bulky studio equipment was necessary for the project since the small ITV camera is highly portable and was remotely controlled from the classroom.



GEOMETRY PROBLEM is televised from the court yard to a second floor class-room during experiment in the use of industrial television as an educational tool. Three students near television receiver (at right) operated the TV pickup.

TELEVISION CAMERA here picks up and transmits activity from basement art class to students in a second floor classroom. Camera was remotely operated by students viewing the ITV receiver in second-floor classroom.

Wood Template Spots Fixture Stud Locations

METHOD

Shooting threaded studs into concrete ceiling slabs with a powderactuated stud-gun cut fixture mounting time to a minimum on a two-level, 192-car, city parking garage in Chicago. G & M Electric, project contractor, took advantage of the fast gun technique to install the 248 mounting bolts for the 62 single-lamp fluorescent fixtures involved. But G & M's Morton Gooze went one step farther. He also streamlined the layout time by designing a simple template that would simultaneously spot the four mounting points per fixture and guide the stud gun.

Using an assembled fixture complete with supporting end-brackets, G & M mechanics made a template from a 4-in. plywood board 7 ft. 2 ins. long and 12 ins. wide. Bracket mounting holes were 6 ft. 6 ins. on centers along the length of the fixture and 4½ ins. apart along fixture width. Around each of these four mounting points as a center, the mechanics cut a 4-in. square in the plywood to seat the square guard of the stud gun. In actual field use it was a relatively simple operation, once the template was aligned and positioned against the ceiling slab, to seat the stud gun in the four cut-outs and shoot the studs. To prevent possible chipping of the



New house? Old house?

...for every room in any house CHROMALOX has the answer

Upstairs, downstairs, all through the house . . . or school, church, motel or office . . . there's a Chromalox Electric Heater designed for the heating job.

Popular Chromalox Electric Baseboard Heaters are available in many sizes and ratings, with matching blank, corner and trim sections for a uniform, neat appearance.

Chromalox Radiant Wall Panels, Wall Insert Heaters and Cabinet Convector Heaters provide abundant heat to meet a variety of other heating requirements and decorating tastes.

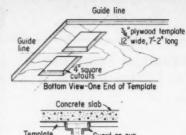
Chromalox Floor Drop-In Heaters quickly solve heat loss problems caused by "picture" type windows.

Chromalox Utility Spot Heaters and Port-

ables concentrate heat where and when it's needed for laundries, home workshops, garages and other small, occasional-use areas.

In addition to all these, the Chromalox line includes unit ventilators, fan driven heaters, Thermwire heating cable, in-duct heaters, and others. Chromalox offers you: good profits, customer satisfaction, nation-wide distribution, and local Chromalox engineering assistance. Write now, or call your Chromalox "Man with the Answers."





ONE END of plywood template showing square cut-outs to seat stud-gun guard. Stud is centered in square opening.

End View - Cutout Seats Gun Guard



TEMPLATE is aligned after being wedged to ceiling slab with 2 by 4's. One end rests against guide-screw in outlet. Template center-line is matched with chalk line on slab.

slab finish around the studs, 0.22 in. long cartridges were used for this job.

Template alignment was easy. A "snapped" chalk line between outlet centers was the main guide. The 7-ft. 2-in. length of the plywood board was chosen to spot the end of the fixture a prescribed distance from the slab outlet to position the specified seal-tight connection from the water-tight outlet cover to the end of the fixture. One end of the template was spotted at the edge of the outlet box by placing it against a long 8-32 screw inserted in the cover hole. Matching the template center-line with the slab chalk line completed alignment. Eliminated were all the tedious measurements and markings necessary if a template were not used.

Once the template was in position, it was held in place by two lengths of 2 by 4's wedged between it and the floor below. The same timbers, cut for the 9 ft. 10-in. ceiling height, could be used for all



A supersonic fury, the Air Force's all-weather F-102 is shown with auxiliary power unit connected which can feed up to 250 amps at 28 volts for starting power and also to energize the electrical system for maintenance procedures; thus relieving strain on aircraft batteries. Twin, parallel type Okocords are widely used to connect auxiliary power unit to aircraft.

Surer starting, time after time

...with OKOCORD

On today's supersonic fighting craft, an auxiliary power unit is used to energize the plane's electrical gear while it's on the ground... and to feed in the extra jolt of juice needed to start it on its skyward lunge.

Okocord cable is widely used for this critical chore. It stands up with unfailing dependability to being dragged along concrete runways...to being left for hours on end in water



Twin parallel Okocord

and oil...to wide variations in temperature...to being run over by various airstrip vehicles.

From any standpoint: reliability, flexibility, strength and extra long life—Okocords are the best bet to end your portable cable problems once and for all. Facts, figures and specifications in free Bulletin EC-1108, The Okonite Company, Passaic, New Jersey.



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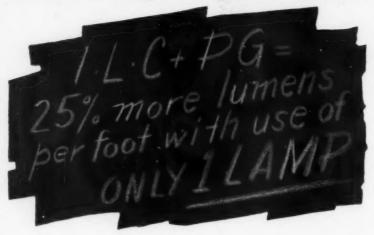
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where there's electrical power... there's OKONITE CABLE

A New Lighting Formula!



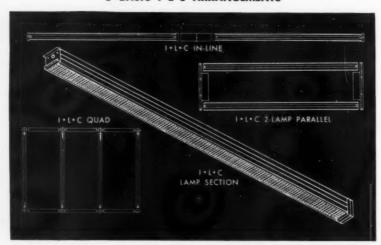
INDIRECT LUMINOUS CEILINGS



I • L • C—the first lighting fixture designed to use Power Groove fluorescent lamps with complete visual comfort for commercial lighting at 100 to 250 ft. candles.

Therefore, I·L·C with only one P. G. lamp actually provides 25% more lumens per foot than other units with two lamps when used in large selling and display areas. It all adds up to—more and better quality light at less cost with I·L·C.

3 BASIC I.L.C ARRANGEMENTS



- I L C IN-LINE: Continuous single row tandem arrangements of two or more lamps with associated ballast enclosures and hangers.
- I L C 2-LAMP PARALLEL: Two lamps in parallel arrangement on 24" centers, for individual or continuous row installations.
- 1-L-C QUAD: A multiple lamp system with provision for four or more 72" or 96" lamps in parallel and in-line arrangements, or both, and with spacing between lamps of 4', 6' or 8' as required.

For complete details send for Bulletin \$257

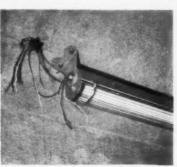
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SILVRAY LIGHTING, INC.

BOUND BROOK, NEW JERSEY



STUD GUN guard is placed in template cut-out and threaded stud "shot" into ceiling slab. Stud in foreground is already in place.



FIXTURE in place with end brackets supported by studs. Flexible seal-tight connection from box cover will enclose wires.

fixtures on the floor. Once the timber wedges were in place, a few hammer taps on the template accomplished final alignment.

Two mechanics, one at each end of the template, worked from stepladders. After one man shot the two studs at his end of the template, the other mechanic repeated the operation at the other end. Total observed time for installing four studs (per fixture) was approximately eight to nine minutes. This included moving ladders, aligning and wedging the template, loading and unloading the stud gun, and shooting the threaded studs. Slightly more time was involved on ramps because of the inclines involved.

Soap and Water Cleaning Of Electrical Machinery

MAINTENANCE

The use of water and detergents for regular maintenance cleaning of over 3000 motors and other equipment is reported by H. D. Jefferson,



New General Electric open-dry transformers with aluminum conductors weigh up to 14% less

SOUND-LEVEL PERFORMANCE SIGNIFICANTLY IMPROVED

Aluminum is used for all currentcarrying parts of General Electric's completely re-designed line of open dry-type transformers, 300 to 2500 kva. Result: weight reductions of up to 14% over previously available G-E ratings. In addition, these new transformers feature lower sound levels in every kva rating—for improved indoor performance.

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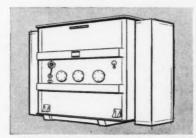
Still other benefits of the new design—which has been "proved out" in exhaustive field tests—include lower losses and elimination of conductor-joint problems through use of welded construction where possible.

FOR OVERHEAD INSTALLATION

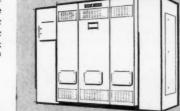
Wherever floor space is at a premium, these new G-E open dry-type transformers are ideal since new lighter weight makes overhead mounting—on balconies and catwalks—simpler than ever. G.E.'s new line of sealed dry-type units—also featuring aluminum conductors—provides similar advantages where air is contaminated by dust, dirt, or chemicals.

FOR MORE INFORMATION

For full information on this new line
—or any transformers in the complete
G-E line, contact your General Electric
Apparatus Sales Office. General Electric
Company, Schenectady 5, New York



SEALED DRY-TYPE transformers also feature the new all-aluminum conductors.



INTEGRAL DISTRIBUTION CENTERS utilize either open- or sealed-dry transformers.

Progress Is Our Most Important Product

GENERAL





Hein-Werner's new TAL-BENDER is fast ... effective ... safe! All bending is done cold without filling. One frame handles rigid and thinwall conduit, standard 80 and 160 schedule pipe, copper tubing, bus bar and 180° radiant heat coils.

Reduces cost of cutting, threading and welding—eliminates assembling of expensive elbows, couples, fittings and nipples. Models available in range from 3/8" to 8".

THESE SPECIAL FEATURES:

- standard or remote control operation – manual or motor driven.
- easy, quick pipe release.
- large choice of bending shoes in 64 different radius sizes.
- side wall shoe design assures uniform bends.

Hein-Werner also supplies industry with a full line of performance proven hydraulic jacks in capacities of 1½, 3, 5, 8, 12, 30, 50 and 100 tons; PUSH-MASTER Hydraulic Jacks in capacities of 4, 10, 20, 30 and 60 tons; and, "Push and Pull" Hydraulic Jacks and Attachments in 4, 10 and 20 tons.



Write us for complete catalog specifications.

electrical engineer at the plant of Dole Hawaiian Pineapple Company Ltd., Honolulu, Hawaii. This method has been used at the plant for over 30 years and has been found highly successful. However, the method is not widely known or used in industry.

Development of the water cleaning method at the Dole plant began in 1929. By a special process, the equivalent of 4000 tons of refined sugar is extracted from the juices each year. The shredding system set up for this process consisted of three machines driven by three vertical 60-hp motors. The problem developed when one of these motors failed to start about six months after installation. Examination of the defective motor revealed that the air gap was filled with a gummy material which had condensed out of the vapors from the shredding operation. The vapors had been drawn into the motor by its ventilation system. The gummy deposit was citric acid and sugar.

As a first attempt at cleaning, hydro-carbon and carbon tetrachloride solvents were used, but they failed to remove the deposit. As an alternative trial method, the whole motor was placed in a tank of boiling water to which bicarbonate of soda was added to neutralize the citric acid. After the gummy mass had dissolved, the windings were thoroughly washed with hot water from a hose until the final end drippings did not react on either blue or red litmus papers-indicating an absence of both acidity and alkalinity from the drippings.

By shielding the air passages, they have increased the life of these motors and have limited cleanings to once a year. They have never experienced a failure in the winding of these motors. One of these motors was rewound but only because it would not respond to the vacuum-pressure varnish impregnation baking system, and its insulation value fell below two megohms.

The original washing technique has since been developed into a method for using water and detergents for cleaning all motors and other equipment. The arrangement in use today is as follows:

Into a 50-gal drum of water, three pints of aqua ammonia and one quart of oleic acid or red oil are added. This mixture is the best that has been used, principally because undissolved particles of detergents may not be washed off the windings and they are hygroscopic. The mixture is used directly from the barrel by a Turco Products



Here operator checks application of special lacquer coating which gives CIRTUBE EMT its easy fishing.

The fishing's easier, too with new CIRTUBE*EMT

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om ets PULLING wire through carelessly made, ordinary EMT often proves an annoying, time consuming business.

The answer isn't just a slick inside surface—what's needed also is a sort of built-in lubrication that helps conductors glide smoothly through long runs.

CIRTUBE EMT is made that way—with a baked-on protective inner coating containing wax-like ingredients in a special formula—always carefully applied to give the same easy fishing each time.

Here are other reasons why CIRTUBE EMT is always so easy to fish: clean, snag-free finishing is one; induction welding is another. This superior welding technique leaves no flash or bead to interfere with wire pulling.

Easy fishing is only one of many reasons why CIRTUBE EMT has won such quick acceptance. Give it a try next time you order—you'll like working with it. Now at your Circle wholesaler's.



WIRE & CABLE
a subsidiary of
CERRO DE PASCO
CORPORATION

PLANTS: Maspeth and Hicksville, N. Y. SALES OFFICES & WAREHOUSES: In all principal cities RUBBER COYERED WIRES & CABLES • VARNISHED CAMBRIC CABLES • PLASTIC INSULATED CABLES NEOPRENE SHEATHED CABLES • "CIRTUBE" EMT





Proper steel plus! The best cold rolled steel plus the right handling give CIRTUBE EMT its natural bendability.

Split-free, bead-free! Induction welded CIRTUBE EMT, left, proves stronger than ordinary EMT, provides easier fishing.





Automated quality control!
Automatic controls assure complete and continuing uniform quality of product.

Lifetime exterior finish! Hard galvanized finish for durability; polished satin lustre for lasting good looks.





Tight, easily handled bundles!
Bright, orange tapes hold CIRTUBE EMT
securely for easy handling on and off the job.

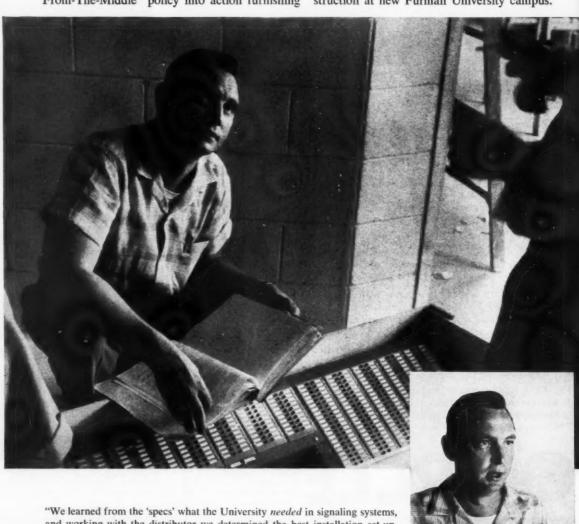
Fast, friendly service! Well-known Circle service through a nation-wide network of well stocked nearby warehouses.



"Be more than just an installer-that's what sells our service"

Meet Tommy Ayers, electrical contractor's man, one of the team that put their company's "Service-From-The-Middle" policy into action furnishing

and installing Fire Detection, Clock and Program, and Return Call Systems in the extensive construction at new Furman University campus.



"We learned from the 'specs' what the University needed in signaling systems, and working with the distributor we determined the best installation set-up. With assistance from the distributor and manufacturer's rep, we then put the system in. We call it 'Service-From-The-Middle' and it works...to everybody's satisfaction! Our clients get what they want...we see to it that it's what they need...and working closely with the distributor and manufacturer we see that it goes in right and stays in."



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on-

Tommy Ayers, electrical job superintendent and C. T. Branyon, electrician (right) of Davis Me-

chanical Contractors' Greenville, S. C. headquarters, and Edwards Technical Representative, Bill Kreidler, check over 800 button Edwards return call panel before installation.



"Close contact with the distributor and the manufacturer's man eased the problems involved in putting in individual fire detection systems protecting each building and tying them all in with a central locator panel which automatically pinpoints the danger area when any alarm is activated." Dearman with estimator George Burdette, Phillips and Kreidler discuss a fire alarm box on the second floor of a dormitory.



On the job consultation with the distributor follows up long planning sessions Ayers and distribu-

tor's man, Alvin Phillips (left), of Sullivan Hardware Company's Greenville office, check installation plans with Furman University's resident engineer Carl Clawson (right) in entrance to the main dining hall.

"Service-From-The-Middle" has payed off for us in selecting and recommending systems, preparing estimates, coordinating deliveries and, of course, in client satisfaction. It helps us put in good systems that *stay* in. Most of all, it helps us perform real service to our customers, makes us more than mere installation men...that's what sells our service!"

Phillips, Kreidler, Clawson, Burdette and Ayers check out completed installation of Edwards Program Instrument in the Furman Library.



The Edwards Company believes that contractors have an important but sometimes under-rated job to do in the electrical industry. Often we run across men in contracting, like Tommy Ayers of Davis Mechanical Contractors, who are doing their job very well indeed. We're glad to be able to relay their ideas.

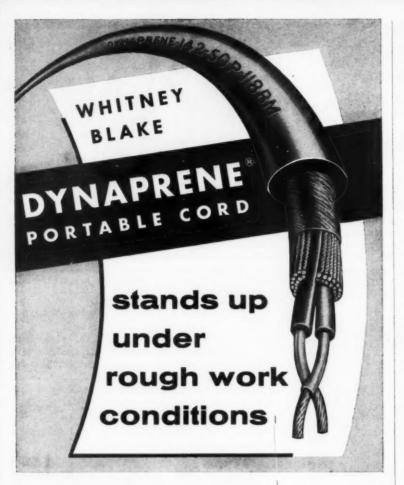
Preparing estimates, Phillips and Davis Mechanical's estimator, Bill Dearman, combine forces to prepare estimates in Davis Mechanical's Greenville offices.



EDWARDS

Specialists in signaling since 1872
DESIGN • DEVELOPMENT • MANUFACTURE

Edwards Company, Inc., Norwalk, Connecticut (In Canada: Edwards of Canada, Ltd., Owen Sound, Ontario)



Where portable cord takes a beating because of rugged work conditions, WHITNEY BLAKE DYNAPRENE stands up and gives long, economical service.

DYNAPRENE has an especially tough neoprene jacket, it resists abrasion, has high flexibility and long flex life, and provides premium quality service at competitive prices.



Company "Steamrite Cleaner Type Al". This device mixes steam and water with the detergent as it is drawn from the barrel at any pressure, temperature and dilution required.

There are many advantages in using water as a cleaning agent—

1. It costs very little.

2. It does not act as a solvent on the varnish of the windings.

It does not cause rusting as carbon tetrachloride does.

4. It is not dangerous to inhale.5. It is now the only acceptable

5. It is now the only acceptable way of preparing a winding for the application of silicone.

6. It affords excellent cleaning of ball bearings and oil sumps of ring-

type bearings.

In this plant, they use the water cleaning method on all ac and dc windings, motors, stators and armatures, transformers and oven control panels. After washing, equipment is dried in an oven and, if required, is given a vacuum-pressure impregnation of a thermosetting synthetic varnish containing silicone to aid in water repellancy, with an additional coat of red lacquer and a final baking. On very dirty motors from a machine shop or areas where oil mist is present, the cleaning operation can be speeded up by simply applying a kerosene-like solvent to soften the hardened oil.

The quality of water in any particular area may have some bearing on whether or not to use this system. Honolulu water is relatively pure and soft. Its sodium chloride content is up to 8 grains per gallon. Its hardness expressed as calcium carbonate is 4 to 5 grains. Overall, this low-cost cleaning system has produced excellent results in the Dole plant.

Mobile Platform For Overhead Work

INSTALLATION

A telescoping aluminum work platform saved 25% of labor cost installing overhead conduit and fixtures in nine buildings of the state of Georgia new Farmers Market, Atlanta. Concrete block walls divided each building into separate bays for a total of 78 bays in the project. Conventional fixed scaffolding requiring dismantling on each move was impractical. Although extension ladders could be used, the contractor, Knowles Electric Co., wanted the safety of the enclosed work platform, known as Tallescope.

COUNTDOWN ON INSTALLATION TIME WITH the NEW Smitheraft SLENDEX

A troffer so shallow it handles like tile! Designed to cut costs where it counts — on installation and maintenance time! Slender, sleek styling complemented by unique engineering

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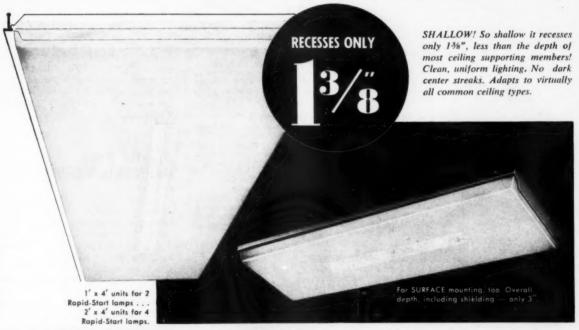
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he dch xhe o., features . . . SLENDEX requires no extra depth for tilting . . . goes into the ceiling FLAT. Solves acute ceiling space conditions . . . simplifies your lighting job.





SLENDEX SOLVES TOUGH CEILING PROBLEM!
Selected from the offerings of 14 other manufacturers:
Smithcraft SLENDEX, 100 SLENDEX 2'x 4' units, installed
in the testing laboratory of one of the nation's largest steel
companies. Low ceiling (7'6" at lowest point), minimum
cavity (only 1½" in depth).

Write today for the complete Smithcraft Catalog.

Smitheraft LIGHTING

"America's Finest Fluorescent Lighting"



No. 884 Hydraulic Power Bender for conduit sixes 1/2" - 4". For faster, easier 90° bending of conduit in ten sizes up to 4"... makes full 90° bend with one ram stroke. Operated with the GREENLEE No. 798
Power Pump as shown here, the GREENLEE No. 884 Power Bender bends 4" conduit or pipe 90° in just four minutes, . . makes same bend in only thirty seconds with No. 797 Power Pump. Develops 40 tons ram pressure — yet high-strength aluminum and steel construction reduces Develops 40 tons ram pressure—yet nign-strength aluminum and steel construction reduces weight to minimum. Easily wheeled from job to job on pipe supports specially designed to serve as rollers. Operates in any position. Conduit is inserted and removed from front . . . one pair of universal pipe supports rotates to handle all pipe sizes . . . a dozen special features place this new bender in a class by itself for versatility, speed, and ease of setup and operation by one man.

No. 880 Lightweight Hydraulic Bender for conduit sizes 1/2" - 2". No. 880 Lightweight Hydraulic Bender for conduit sizes ½" - 2". Makes full 90° bend with one ram stroke. .. assures uniformity of bends in pipe and conduit of ½" through 2" sizes. One man easily carries and operates the Grebnler No. 880 Hydraulic Bender . . . simplified quick setup. Ram fits Grebnler thin-wall conduit, tubing, and bus-bar bending attachments. Designed for easy hand-pump operation, the No. 880 also teams with a GREENLEE power pump for production jobs.



No. 770 Hydraulic Bender for conduit sizes 11/4" - 3". Maximum piston pressure of 25 tons for fast, easy bending. One-man operation. Easily operated by hand or a power pump, the No. 770 Bender makes fast, smooth bends without the use of heat or filler. Extra attachments available for bending 1/2", 3/4", and 1" sizes.

No. 775 Hydraulic Behder for conduit sizes up to 5". Similar to the No. 770 Bender, but is designed to bend larger size conduit and has a maximum pressure of 40 tons. Will easily make smooth, precise bends in cold conduit and pipe. Either hand- or power-pump-operated. Shoes and supports available for this machine make it possible to bend eight sizes of pipe from 11/4" to 5".

Nos. 770-T and 775-T Thin-Wall Hydraulic Conduit Benders.
GREENLEE No. 770 or 775 Power Unit with attachments to make a full 90° bend with one ram stroke and prevent crushing and kinking of thin-wall material. The attachments bend 34" - 2" thin-wall conduit . . . easily and quickly applied to the No. 770 or 775 Power Unit.

Nos. 770-BB and 775-BB Hydraulic Bus-Bar Benders. For making accurate bus-bar bends in a wide range of sizes. Consists of the No. 770 or 775 Power Unit fitted with a GRBENLEE bus-bar bending attachment. Regular "U" bends, 90° bends, or offsets are easily made in any size bar up to 6" wide and 1" thick.

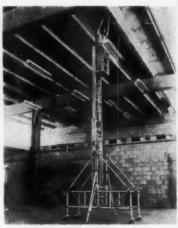
No. 785-BE Power Bonder. A powerful portable bender for heavier bending. Develops 100 tons of ram pressure to bend rigid conduit or standard pipe in 11/4" to 6" diameters, and is rugged enough to bend 5" extra-heavy or double-extra-heavy material with ease. 20" stroke permits 90° bends in one setting. Can be driven by either an electric or gasoline motor.





Make smooth holes for conduit in seconds with a GREENLEE Hydraulic Knockout Punch Driver and GREENLEE Knockout Punches. Use driver with all size punches for conduit ½" through 5". Driver available separately (No. 7646A), or in handy sets with ten punches for ½" to 4" conduit (No. 7310), or with six punches for ½" to 2" conduit (No. 7306). Also separate set of four punches for $2\frac{1}{2}$ ", 3", $3\frac{1}{2}$ ", 4" conduit (No. 7304). Knockout Punch No. 743 is available for 5" conduit.

GREENLEE TOOL CO., 1749 COLUMBIA AVE., ROCKFORD, ILLINOIS



TELESCOPING PLATFORM provided safe, efficient overhead work in the installation of fluorescent luminaires in the highbay areas of Farmers Market, Atlanta.

Tallescope was readily folded down to pass through doorways and rolled from bay to bay. Over \$1,000, representing about three times the cost of the work platform, was saved in installing 3,600 fluorescent fixtures. Lightweight, rapidly assembled by one man, Tallescope extended instantly for reaching heights up to 30 ft. Tallescope is 29 ins. wide, is equipped with wheels for complete mobility, and is made by Up-Right Scaffolds Company.

Plastic Rope For Cable Pulling

INSTALLATION

Rope stranded from Mylar, a new duPont polyester film with high strength properties, may have solved the common problem of pulling cable through conduit. On a recent Pacific Coast project, R. C. Electric Company of Redwood City, Calif., pulled four electrical cables weighing more than 1,200 lbs through a 162-ft length of 4-in. conduit with a Mylar rope only § in. in diameter.

Obtaining pulling lines that are strong, yet will not damage conduit, long has been a problem facing electrical contractors, according to Ernie Canete, president of R. C. Electric. His firm had previously tried fiber ropes with some success, but their life span was short with breakage often occurring on the first job when the pull was a long one. Steel cables also were tried, but when the conduit contained a bend, the cable frequently cut the pipe in these sections.

The 162 ft of conduit through



What? Remember all these items? No-let one Anaconda Cable Jointing Kit do the job-it will

- · Save design time
- Reduce inventory problems in supply room
- · Pinpoint responsibility

- · Save time accumulating material
- Save extra trips for missing materials
- Simplify ordering

Joints are not difficult to make—if you have all the proper materials at the right place at the right time!

But to make sure you do have them, many steps are involved: You must design the joint. An accurate bill of material must be written. You must take care of the purchase of each individual component and expedite and coordinate delivery to assure the arrival of all materials on the job site at the right time.

How much easier to take care of it all in *one* step—with a completely engineered cable jointing kit from Anaconda! No time wasted on designing, purchasing, expediting or coordinating! Each Anaconda kit contains *everything* you need for one complete splice! Including drawings and instructions!

In addition, ordering is simplified and responsibility is con-

centrated when you order your accessories and cable from the same manufacturer. When that manufacturer is Anaconda, you know that your accessories have been designed *right*—by people with years of experience in cable development.

Anaconda also offers a complete line of potheads for all types of power cable. The parts are interchangeable for greater adaptability, easier installation, faster delivery, lower cost.

Get in the habit of ordering your accessories when you order your cable—from Anaconda. For full technical data on all Anaconda Cable Accessories, see your local distributor or the *Man* from Anaconda. Cable Accessories Technical Catalog (C 79: 13-14) available on request. Please write Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.



FOR CABLE ACCESSORIES

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See your industrial, hardware or electrical supplier



ARRO EXPANSION BOLT CO

DEPARTMENT D, P. O. BOX 388, MARION, OHIO



ELECTRICAL CABLES weighing more than 1200 lbs are fed into 4-in. conduit through which they were pulled for a distance of 162 ft by means of Mylar



ELECTRIC WINCH is fastened to steel column at end of cable run, providing pull on Mylar rope which was used to pull four 500 MCM's through 162-ft run of 4-in. conduit.

which four 500 MCM, RHW electrical cables had to be pulled, contained one 90-degree bend and two offsets. Its first 100 ft was made of Orangeburg pipe, followed by 62 ft of galvanized conduit.

For the job, a 3-in. conventional three-strand rope of Mylar was selected, pulled by an electric winch. Mylar in this size is more than twice as strong as corresponding fiber rope while still retaining much of the same handling characteristics. Unlike many other plastic materials, it has virtually no stretch factor. Job Foreman Vernon Smith reported the Mylar was in good condition after its long pull.



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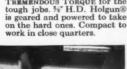


There's a Black & Decker Drill powered for every job!



LITTLE SHORTY'S the drill you want for those hard-to-get-to, around-corner jobs. Gets in tight spots! Excellent for small unit assembly.

TREMENDOUS TORQUE for the tough jobs. %" H.D. Holgun® is geared and powered to take on the hard ones. Compact to







DRILLS UPSIDE DOWN! B&D Magnetic Drill Press sticks to the wall like a fly; operates manually or with exclusive remote control.

Most Powerful drill of its size available, the ¾" Standard! A rugged tool with plenty of zip in reserve. Fully reversible; positive drive chuck



71% of purchasing agents say make mine Black & Decker!

A recent industrial publishing company survey reveals that when purchasing agents need electric tools most think first of Black & Decker! One reason why: 33 different drills each designed to give you the power you need plus easy handling and long, troublefree life!

If you have a drill problem—a small hole in trim to a large hole up among the structural steel-be sure to see Black & Decker. Better still, mail the coupon for a free demonstration of our drill line. The Black & DECKER MFG. Co., Dept. 1105, Towson 4, Maryland, (In Canada: Brockville, Ontario).



MAIL COUPON FOR FREE DEMONSTRATION THE BLACK & DECKER MFG. CO., Dept. 1209, Towson 4, Md. Delease arrange for a demonstration of the following drill(s) ... ☐ Please send me additional information.

Name.....Title Company.....

So easy on the eyes of



This handsome new bank and office building in Fort Worth, Texas, houses the Mutual Savings & Loan Association. Architect: Preston M. Geren. Consulting Engineer; Yandell, Cowan & Love Engineering Co.

Texas...

Curtis Visioneers provided high levels of illumination, Eye-Comfort diffused lighting . . . blending with modern low-ceiling architectural design . . . at Fort Worth savings and loan company

An office where banking transactions are made has a special need for lighting that assures visual acuity. Fort Worth's Mutual Savings and Loan Association was faced with this problem: how to achieve modern low-ceiling construction, yet obtain high levels of illumination without objectionable shadows or glare. Solution: Drawing from a wealth of experience, Curtis created a continuous luminous ceiling through use of Strato-Lux. Result: a lighting system compatible with the modernistic low-ceiling design of the building -that provided high intensity lighting with even-panel illumination . . . yet delivered low brightness quality. No glare, no distracting shadows or eye strain. Using standard products, with slight modifications to satisfy your job requirements, when necessary, Curtis visioneers can assist you, whatever your commercial lighting needs. So write today for the name and address of the Curtis Visioneer in the principal city nearest you. Curtis Lighting, Inc., 6135 West 65th St., Chicago 38, Ill. In Canada: 195 Wicksteed Ave., Toronto 17 Canada.

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Curtis Strato-Lux provides high levels of glare-free illumination to promote efficiency and serenity. Exceptionally low ceiling brightness is achieved through use of #6025 Holophane acrylic plastic Controlens.



Even with Strato-Lux directly overhead, there are no bright spots, no reflections, in critical viewing areas. Acrylic plastic panels never discolor, can be slipped out one at a time and dipped in detergent for cleaning.



Visioneers in Planned Lighting



ALLIS-CHALMERS individually enclosed LOW VOLTAGE BREAKERS

Deep removable cover





simplifies breaker inspection ...adjustments

For fast, complete breaker inspection, use Allis-Chalmers individually enclosed low voltage breakers. Removing only the cover, instead of the entire breaker, provides full, easy access from all angles,

Easy installation, inspection, and operation are yours with Allis-Chalmers breakers. Get complete details. Call your nearby A-C distributor or office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS



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numbers

Product News



Circuit Breaker (1)

Metal-enclosed 6-pole anode circuit breaker, designated Type FB, permits drawout of individual poles without interruption of process power. Advantages include: quicker servicing; greater flexibility in arrangement of individual breaker poles within the metal enclosure; less aisle space needed to remove and turn breaker. Each pole of circuit breaker is complete in itself and may be mounted independently of other poles. Usually mounted adjacent to rectifier cabinet, poles may be arranged six abreast, in two groups of three abreast mounted back-to-back, or in two groups of three abreast mounted one atop the other. Type FB breakers can be equipped with necessary relays and controls to provide completely automatic protection of unattended rectifier stations.

Switchgear Division, I-T-E Circuit Breaker Co., 19th and Hamilton Sts., Philadelphia 30, Pa.

Lighting System (2)

An improved lightweight and flexible 20-amp Universal lighting system, designed for use in commercial and industrial lighting as well as for stores, store windows, showrooms, offices and public buildings. Fixtures may be positioned at any spot throughout the entire system. Unique terminal and receptacle twistout plugs provide positive, safe connections anywhere along its length. Receptacle twistout plug has opening for 2- or 3-wire attachment plugs. Entire system may be moved or relocated. 20-amp lighting duct is made in sec-

tions which join together mechanically and electrically by means of a special coupling. Interlocking clips hold the section together. There are five different methods of suspension for the system—surface, messenger cable, rod hanger, and hat section (with roller hanger or with fixed hangers).

BullDog Electric Products Co., a division of I-T-E Circuit Breaker Co., Detroit, Mich.

Visual Alarm (3)

Visualarm condulets can provide at-a-glance indication of operating conditions. A high speed flasher on the alarm light attracts the operator's attention. An independent circuit can actuate a horn, siren, or bell, if an audible signal is also desired. A reset switch silences the horn or bell and changes the alarm light from flashing to steady until the fault is corrected. Two models are available. Type EKP is explosion-proof, designed for use in chemical process industries, oil refineries, similar hazardous locations. Type KP is both dust-ignition-proof and weather-resistant, for use in grain handling and food processing plants, boiler rooms, and many other indoor and outdoor locations.

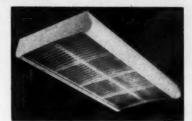
Crouse-Hinds Company, Syracuse 1, N. Y.



Fans (4)

New belt drive fans, named Type BV, are planned for general ventilation of factories, hotels, schools, churches, hospitals, theatres and institutions. Features include: allsteel welded construction, streamlined venturi orifice, precision balanced blades. All BV fans have PFMA certified ratings.

Power Line Fan Company, Plainfield, N. J.



Lighting Fixture

A new fixture series, called Hector, was designed specifically for the Holophane Prismalume lens. Side panels produce low contrast with ceiling and lens. Unit is ideal for prestige areas; reception rooms, executive offices and exclusive

(5)

shops, or where the work is intricate and complex.

Lighting Dynamics, 802 W. Whittier Blvd., Whittier, Calif.



Regulator

A new all-purpose two-stage regulator combines magnetic, electric amplifiers. Bulletin 5100 Type "GS" regulator has a magnetic amplifier control input stage and gridcontrolled rectifier power output stage. A unique "grid switching" circuit controls the output rectifiers. The magnetic-amplifier control stage provides multiple electrically-isolated inputs at low power and impedance levels in a completely static unit. It is available in three sizes: 5-amp, 12.8-amp and 36-amp maximum with intermediate ratings available. AC supply is 220/440/550-volt, single phase, 60

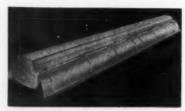
Clark Controller Company, 1146 East 152d St., Cleveland 10, Ohio



Elbow (7)

Designed and engineered particularly for use with 90° connections using liquid-tight conduit in limited space, the new JIC 90° pulling elbow is liquid-tight, weatherproof, and dust-tight. They are for outdoor or indoor connections. The fitting is made of malleable iron, has a cadmium plate finish and is fitted with a galvanized steel cover. It is UL and JIC approved. It is available in ½, ¾ and 1 in. sizes.

Appleton Electric Co., 1701 West Wellington, Chicago 13, Ill.



Industrial Fixture (8

The new All-Brite line of deluxe Industrialist fixtures consists of RLM Series 81, semi-direct with upward component; and Series 80, totally direct, but not designed for RLM specifications. Fully metal frames 35°-30° metal louvers are available. All models in these series may be mounted on surface, chains or stems. Both series are available in 2- and 3-lamp, 48-in. fluorescent, rapid-start and 430-ma slimline; and 96-in. 430-ma slimline and 800-ma rapid-start. Catalog is available.

Fluorescent Fixtures of California, 352 Shaw Road, South San Francisco, Calif.

Thermostat (9)

A new electric heating thermostat featuring the scale plate marking system. Temperature setting is obtained by means of a lever extending up from the central dial. Model T460A protrudes less than an inch from the wall and extends

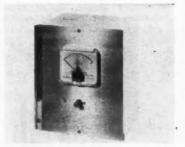
½-in. into outlet box. Available in single pole, single throw and double pole, single throw models, the thermostat has a load capacity of 5000 watts at 230 volts. It is designed for wall mounting, with other models available for surface mounting on baseboard heating units, wall heaters or space heaters.

Minneapolis-Honeywell Regulator Co., Minneapolis 8, Minn.



Two new features, designed to increase structural strength and prevent abrasion of wiring insulation from screws, have been incorporated in the hinged-cover and screw-cover lay-in wireways. Full length flanges are now formed along the cover side of the wireway. In addition, the metal on both sides of each screw hole is embossed, so that, when installed, the ends of the screws are completely recessed between two smooth, beveled "runners" which protect wiring insulation from damage and abrasion. These built-in channels comply with UL requirements.

Keystone Manufacturing Co., 23328 Sherwood Road, Warren, Mich.



Control (11)

A new electrical control device which makes it possible to stop an overloaded electrical motor during the critical peak or starting load period. Designed to respond instantly to all momentary overloads. the safe-load relay, as it is called, is applicable to nearly all types of motorized applications, ranging from single-motor machine tools and conveyors to multi-motored transfer and automation setups. Action of relay is controlled by a second or "limiting" pointer which can be reset very close to the actual normal electrical power required by the drive.

Baker Perkins Inc., Saginaw, Mich.



Transformer

(12)

A portable step-up potential transformer to provide low ac voltage ranges on its rectifier-type, acdc ammeter-voltmeter. Transformer has primary ranges of 5, 15, and 30 volts to 150 volts secondary, 60 cycles. Intermediate ranges above 30 volts can be handled by taps on the recorder between 0-50 and 0-150 volts. It is approximately 5 by 6 by 14 ins. high, including handle.

Esterline-Angus Co., Inc., Box 596, Indianapolis 6, Ind.

Electric Heaters (13)

A new line of recessed convection electric heaters; from 500 to 3,000 watts with an output of up to 10.246 Btu's. It features "back-to-back" mounting of "black-heat" elements. When installed, units protrude 2 ins. They are UL approved. Temperature is automatically controlled by built-in thermostat with pilot light. Cabinets are finished in choice of chrome, white, gray, tan.

Circle-Air Industries, Inc., 244 Herkimer St., Brooklyn 16, N. Y.

Connectors (14)

Liquid-tight connectors have insulated throat made to Sealtite specifications. They are made in sizes from \(\frac{3}{2}\)-in. to 2-in. iron pipe size, in straight connectors, and 45° and 90° angle connectors.

Gedney Electric Co., 1250 Sixth Ave., New York 20, N. Y.

Outlet (15)

A new 3-wire grounding outlet No. 5232 with pressure terminals is designed for industrial and business installations and also for home use. Outlet, for use with No. 12 and No. 14 solid wire, has bronze springs that hold wires securely; bronze contacts with rounded surfaces; double-grip contacts fully enclosed in individual pockets; and built-in sloss.

Pass & Seymour, Inc., Solvay Station, Syracuse 9, N. Y.

Westinghouse electrical system
specified to Power-Up
Ford products plant

YOU CAN BE SURE ... IF IT'S Westinghouse W

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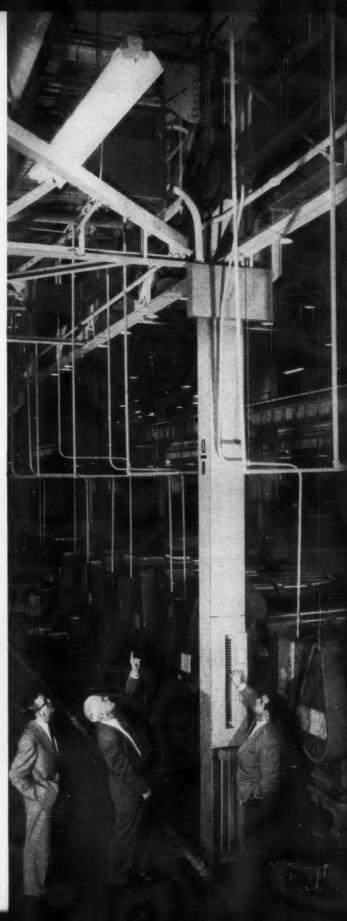
(15) atlet ls is ousi-

ome and onze rely; surfully and StaCOVER PHOTO: Assembled in the plant layout room of the Ford Motor Co., General Products Division Plant, Indianapolis, Ind., are: Melvin Wetterlin, Westinghouse Sales Engineer, J. Vance Garinger, Project Engineer, Hatfield Electric Co., Inc., Electrical Contractors; S. V. Cornforth, Maintenance Engineer, Plant Engineering Department, Ford, Indianapolis; D. A. Kerry, Supervisor, Ford General Products Division Staff, Dearborn, Michigan; H. P. Jones, Manager, Plant Engineering Department, Ford, Indianapolis; James Miller, Westinghouse Construction Sales Engineer; and R. Richards, Supervisor, Engineering Planning, Plant Engineering Department, Ford, Indianapolis.

Melvin Wetterlin, J. Vance Garinger, and J. Rodriquez, Power and Waste Supervisor, Plant Engineering Department, Ford, Indianapolis, look overhead to identify the Westinghouse 45-kva DT-3 dry-type transformer, Westinghouse aluminum bus duct and Westinghouse fluorescent and high-bay lighting. Westinghouse NLAB-LX column-type panelboard, shown with trough and pullbox, is fed from the secondary of the drytype transformer above.



Main entrance to Steering Gear and Cold Heading Plant, General Products Division, Ford Motor Company, Indianapolis, Indiana. Westinghouse electrical distribution system is used to meet present electrical needs, provide the necessary flexibility to permit extensive rearrangement of production machinery whenever required and to assure maximum facility in expanding to satisfy all future demands.



Ford plant planning anticipates future power needs

The Ford Motor Company plant in Indianapolis, Indiana, where these pictures were taken, occupies more than 1,400,000 square feet of floor area. It requires a constant power supply of 26,500-kva. The combination of great size, large capacity and exacting, but frequently varying, production schedules makes it imperative that plant engineering must go beyond careful control of everyday operation. Planning for future demands becomes equally important.

Westinghouse, working with architects, consulting engineers, general contractors, electrical contractors and Ford engineers, had an active part in equipping this plant with the electrical distribution system and with other electrical components required to assure uninterrupted operation and provide for anticipated expansion. For example, 144 Westinghouse dry-type transformers of various ratings are mounted at heights varying from

22 to 45 feet above floor level, above conveyor trusses. The light weight, ease of installation and minimum maintenance requirements of these dry-type transformers have made it possible to locate them so each provides the required voltage, with minimum loss, to the equipment it supplies.

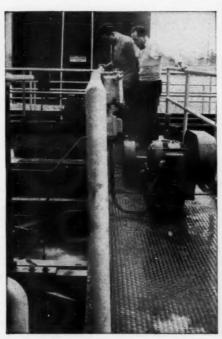
Over 6000 Westinghouse high-bay mercury vapor fixtures give daylight-type lighting in production areas, and these are supplemented by Westinghouse fluorescent lighting for the general illumination required by nighttime clean-up workers.

Approximately 2½ miles of Westinghouse 600amp, 480-v, 3-pole, aluminum plug-in bus duct, mounted in 17 parallel straight runs (shown as (continued)

YOU CAN BE SURE ... IF IT'S Westinghouse



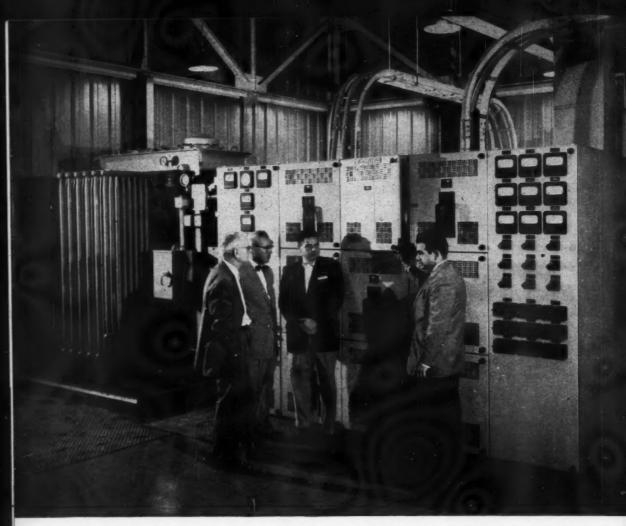
J.Rodriquez checks substation meter to make certain power factor constant at 98% lag is being maintained throughout the plant. This extreme efficiency of the electrical system is made possible by the use of Westinghouse capacitors.



J. Rodriquez and W. D. Eason, Engineer, Waste Treatment Plant, Plant Engineering Department, stand beside Westinghouse 7.5-hp totally enclosed Life-Line® "A" motor which drives the waste oil recovery tank agitator.



Shown between Lloyd L. Williams, Branch Mgr., WESCO, Indianapolis, and Paul E. Butalla, Main. Supvr., Plant Engin. Dept., Ford, Indianapolis, is Westinghouse Slipsyn® synchronous motor starter providing automatic starting and field application control for Westinghouse 400-hp, 440-volt motor.



J. Vance Garinger, Lloyd Williams, C. E. Hamm, Sales Rep., WESCO, Indianapolis, and J. Rodriquez shown before one of the nine power centers which distribute the 26,500-kva load throughout the plant. Power centers have stand-by circuit breakers and blank cubicles equipped for future needs.

Ford plant planning anticipates future needs (continued)

heavy black lines in diagram), have been installed to provide maximum flexibility in locating production machinery.

Westinghouse can help you with any phase of your electrical planning and construction. See your Westinghouse distributor, or write Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa.

Ford Motor Company Steering Gear and Cold Heading Plant General Products Division Indianapolis, Indiana

Architect-Engineers: Smith, Hinchman and Grylls Associates, Inc.

Consulting Engineers: (Waste Treatment Plant) Hubbell, Roth & Clark, Inc.

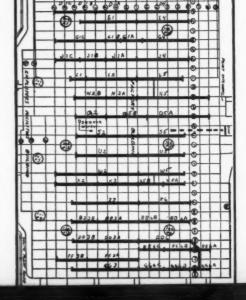
General Contractors: Cunningham-Limp Co., Inc. Electrical Contractors: Hatfield Electric Co., Inc.

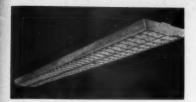
Westinghouse Distributor:

Westinghouse Electric Supply Co., Indianapolis, Indiana

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Over 250 Pages Westinghouse Data in Sweet's Construction File





Fluorescent Fixture

(16)

A slender fluorescent commercial fixture with one-piece extruded plastic side panels, called the Vanguard. Shielding is with a 35° by 35° baffle-louver of 20 gauge steel for permanent straight-line rigidity, which drops on retaining chains for relamping and service. Fixture may be mounted on ceiling or suspended from stems individually or in continuous runs. Fixture is available in 2-lamp 48-in. rapid start or slimline, 4-lamp 48-in. rapid start or slimline; also 2- or 4-lamp 72-in. slimline and 2- or 4-lamp 96-in. slimline.

Peerless Electric Company, 576 Folsom St., San Francisco, Calif.

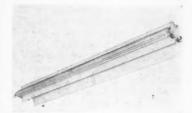
Instrument

ore

(17)

A new tong test ac-dc ammeter is available in eight types. To operate the tong test press the trigger and snap the tongs around an electrical conductor without breaking circuit or insulation—readings are instantly obtained. It measures up to 1000 amps.

Columbia Electric Mfg. Co., 4519 Hamilton Ave., Cleveland 14, Ohio

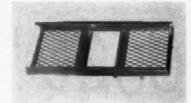


Lighting Units (18)

A new series of factory lighting units, the Monitor, are available with white supercoat baked enamel or RLM-approved porcelain enamel reflectors, both with reflectance factor of not less than 85%. Monitor and Monitor V-25 units use rapid-start, slimline, and high output lamps. Monitor V-25 directs approximately 25% of fixture output upwards through scientifically designed collared apertures; the Monitor provides approximately 15% uplighting in 2-light fixtures, and 12% in 3-light fixtures. Units may be purchased with louvers for

crosswise and lengthwise shielding —20° by 30° for Monitor, and 30° by 30° for Monitor V-25. They may be mounted individually or in continuous rows. Housing is a flanged channel with integral rails for added leaks and align reflectors in continuous rows.

Smithcraft Lighting, Chelsea 50, Mass.



itting

(19)

New built-in adjustable straight drop-out fitting eliminates field cutting and assembling of drop-outs. Opening also can be adjusted up to 6 ins. in one size and up to 11 ins. in another size. Permits insertion of cable from either side of run. Fittings also available with dropouts running diagonally in center of run and end of run.

P-W Industries, Inc., Duncan & Melrose Sts., Philadelphia 24, Pa.

Dead-Ends (20)

Neoprene coated dead-ends are now produced in all sizes for jacketed all-aluminum and ACSR conductors. The dead-ends are applied directly on the jacketing. They are ideal for use in highly corrosive areas both coastal and industrial. They hold satisfactorily under design tension in all weather conditions and temperature ranges from below zero to 125°F.

Preformed Line Products Co., 5349 St. Clair Ave., Cleveland 3, Ohio

Cable Connector

(21)

A new waterproof underground cable connector packaged in a 4-part kit for easy field installation. Kit is composed of a molded rubber receptacle housing with a disposable assembly sleeve, a metal receptacle fitting with a disposable assembly pin, a molded rubber housing for the plug, and a metal plug fitting.

A'G'A Division of Elastic Stop Nut Corp. of America, Elizabeth, N. J.

MAKE TOP DOLLAR ON THE JOB

Install



HEAVY DUTY TOGGLE SWITCHES DOUBLE WIPE T-RATED

UNDERWRITERS LISTED CSA APPR. 10A-125V "T"; 5A-250V



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SINGLE POLE

THREE WAY

SPECIFICATION GRADE

Meet Federal and REA Specifications



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All Available In Brown and Ivory



When the job calls for heavy duty switches, specify these EAGLE numbers above . . . you'll make out better. These EAGLE heavy duty switches wire fast and easy, the framed-in-plastic handle seals and dustproofs the switch, the double wipe contacts last longer . . . common callbacks are eliminated. Just install them, forget about them—and earn satisfied customers, repeat business . . . and top dollar for the job.

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NEW MAINTENANCE MANUAL—
another example of Champion LIGHTmanship,
an attitude and aptitude that makes sure
your customers get all the light they pay
for. Many useful, cost-saving hints have
been added in this new edition of the popular
guide that has proved to be of great practical
value to lighting men everywhere.
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MILLIONS OF LAMPS A YEAR . . . ONE PLANT standard of quality control



Incandescent Fluorescent
Your best buy in lamps

CHAMPION LAMP WORKS

Lynn, Massachusetts
A division of Consolidated Electric Lamp Co.

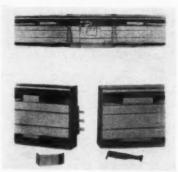


Screw Bodies

(22)

A new line of EMT setscrew bodies are made in types "C", "LB" and "T". Sizes range from ½ in. to 2 in. Made of malleable iron, they are heavily cadmium plated.

Gedney Electric Co., 1270 Sixth Ave., New York 20, N. Y.



Heater

(23)

A new plug-in type electric convection perimeter heater is known as the Tandem 500. Heater is composed of a thermostat section or a starter section, heater section, (as many as are needed for the perimeter of the room) and inside corner sections. Current connection to unit is made through the thermostat. All subsequent sections plug into each other as they are affixed to the wall. Wattage requirement per foot is 143 watts. Front surface temperature 113°F. Thermostat maintains floor temperature at 2° differential. UL approved.

Meier Electric and Machine Company, Inc., 3525 East Washington St., Indianapolis 7, Ind.

Threading Machine (24)

A new ½ to 4-in. pipe and bolt threading machine of improved design. Bolt range is §- to 2-in. Called the Speed-King, the new machine cuts, threads, reams, grooves, chamfers or bevels pipe; and the die head and cutoff carriers throw out. An added feature, for those who wish to make up flanges and fittings in the rear of the machine, is a step-block chuck with rocker

grip inserts like those used in the front. All heads and dies for pipe or bolts 2 ins. and smaller are interchangeable with Model A or Speed-O-Matic machines. It has four spindle speeds 19 to 74 rpm.

Beaver Pipe Tools, Inc., Warren,



Connectors

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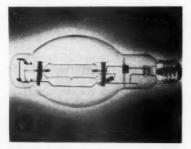
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ker

(25)

A new line of aluminum compression parallel connectors, called KPD and KPO "Press-On". They hook on the run conductor for simple two handed installation, either hot or cold. 23 sizes accommodate No. 6 solid—4/0 ACSR aluminum to aluminum, or aluminum to copper. They can be installed in existing hydraulic or mechanical crimping tools with standard dies such as "D" and "O".

Penn-Union Electric Corp., Erie, Pa.



Mercury Lamp

(26)

A new 400-watt "Bonus Line" mercury lamp, H400-E1/B, for street lighting and general industrial applications. Completely interchangeable with the present 400watt mercury, the new lamp is the same size, fits in the same socket, and uses the same transformer. It has a rated useful life in excess of 9,000 hours. A new tri-metal cathode is mainly responsible for the new lamp's performance. The cathode is double wound, and specially treated to produce more light for a longer period of time. Additional improvements built into the new lamp include a new type resistor and mounting structure.

General Electric Company, Nela Park, Cleveland 12, Ohio



The AMPROBE Jr. gives you so much more...not just a run-of-the-mill voltage tester but a precision-made instrument that measures voltage and current instantly and accurately without shutting down equipment. All this with one rugged and inexpensive pocket-size tool! And now...FOR THE FIRST TIME...at the request of utilities, industrial plants and other large-scale users of AMPROBES, the AMPROBE Jr. has gone SAFETY YELLOW to conform with standard safety practices.

ALL THIS AND A GENEROUS TRADE-IN PROGRAM TOO...that's right, you can get all this and an extra \$2.00 dividend for your old voltage tester...regardless of what it is or what condition it's in.

Yes your authorized AMPROBE distributor is prepared to credit you with \$2.00 towards the purchase of a new SAFETY-YELLOW AMPROBE Jr. for your old voltage tester. So don't delay...stop in at your nearest AMPROBE distributor for the best buy in '58.

Ask yourself these questions	The AMPROBE Junier	ordinary voltage tester
Does it measure current as well as voltage?	YES	NO
Does it give you full visibility on a graduated reading scale?	YES	NO
Does it fit conveniently in your pocket?	YES	YES
Does it measure within ±3% accuracy?	YES	NO
Does it come in a full line of models to meet different problems?	YES	NO
Does it protect you against shorts and shocks?	YES	YES
Does it balance loads, locate grounds, determine motor overloads, check rating of circuit breakers?	YES	NO

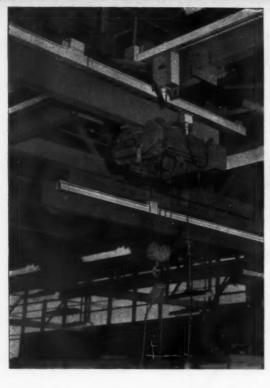
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ordinary

voltage tester?



PYRAMID INSTRUMENT CORP., Lynbrook, New York,



81.8% of plant engineers say...

"steel enclosed trolley busways cut maintenance costs"



Flexible Feedrall systems, in capacities from 60 to 500 amperes, provide convenient movable power sources for cranes and hoists; production, conveyor assembly, and moving test lines; portable and machine tools; cutting and sewing rooms; business machines; lighting; and motor control.

*Survey was conducted among 2,036 plant engineers by an impartial organization and printed in a leading trade magazine. Write for free copy of entire survey.

Why? Because a steel enclosed trolley busway —Feedrail—delivers trouble-free power through overhead mobile outlets that move with the load.

You eliminate long, dragging power cords, cables and reels—as well as the cost of inspecting, maintaining and replacing them. That adds up to considerable savings in both maintenance and downtime.

More! Feedrail speeds up production, reduces accidents, protects buildings and equipment.

There's a Feedrail system that's just right for your crane or hoist, portable tools and other plant equipment. Feedrail is surprisingly easy to install, can be quickly extended or relocated —never becomes obsolete!

Find out now how Feedrail can help you lower maintenance costs in your plant. Send for Bulletin. Write Dept. C-9.

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Never Becomes Obsolete

FEEDRAIL CORPORATION

Subsidiary of Russell & Stoll Company, Inc.
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D REPRESENTATIVES IN PRINCIPAL CITIES

New line of incandescent and mercury vapor lamp luminaires for use in gymnasiums, auditoriums and other similar applications. Single, double, triple or quadruple fixtures permit numerous variations in lighting intensities for correct illumination, whatever the activity. Units are also available in both pendant and recessed types, for high-bay or low-bay installations with 100% downlight or 15% uplight, and in round and square surface mounted units. Square recessed and surface luminaires feature Holophane Hi-Stress "Controlens" with wire guards. All reflector units are formed of aluminum and processed Alzak. Both the pendant, surface and recessed fixtures are listed by UL.

Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3, Mo.



Switch (28

A new strap-mounted switch for submersible sump pumps, designed for mounting on the discharge pipe. The Sumptrol has a dual mounting strap which will accommodate either 1- or 1½-in. iron pipe. It is available with either single or double-pole silver-to-silver contact construction. Switch mechanism closes the visible vertical-action contacts with a rolling, wiping motion, providing positive closing after long periods of pump idleness. It is rated at ½ hp, 115/230 volts ac.

Square D Company, 4041 North Richards St., Milwaukee 12, Wis.

Sign Light (29)

The Line-O-Lite fluorescent floodlight has been perfected to provide high lumen fluorescent lighting of billboards, highway signs, building fronts, parking and working areas. They are rated satisfactory for use in all weather. Where cold weather operation is contemplated, or where operation with the reflector pointed up is normal, a clear acrylic plastic cover protects lamps, and does not distort the light it passes. Inside of reflector is painted with a white reflecting enamel, outside is in natural aluminum or may be painted to suit individual specifications. Floodlights come in four basic sizes -4-, 6-, 8- and 9-ft units. Fixtures can accommodate either high output, very high output, super high output, or powergroove lamps.

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Magni-Flood, Inc., Mount Vernon, N. Y.

Instrument (30)

Jagabi single-range precision hand tachometer is specially designed for particularly accurate speed measurement. Dial diameter is 120 mm (4.7 ins.), and scale calibration is open and easily readable. It is supplied with two large rubber mounted male and female centers, an extensive shaft and center, oil container and dropper, and is in a 9½-in. by 6½-in. by 3-in. case. Bulletin 35-6 is available.

James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa.

Switch (31)

New Uni-Tog starting and speed control switch which works by centrifugal force, is a patented single-unit device for all makes of universal, capacitor and split-phase motors. It is available in three basic sizes and 20 bore diameters, set at 900, 1200, 1500, 1800, 3000 or 3600 rpm.

Kirkwood Commutator Corp., 4853 W. 130th St., Cleveland 35, Ohio

Steel Framing (32)

FlexAngle, a universal slotted angle system of all-steel framing, is for use in the erection of storage racks, electrical mounting racks, overhead cable supports, machine guards, motor mountings, work benches, scaffolding, etc. It is produced in 11 ga. and 14 ga. steel with a gray enamel or hot dipped galvanized finish. Each gauge is packaged eight 12-ft lengths or ten 10ft lengths. Angle size for both gauges is 23-in. by 15-in. There are 45 pre-notched holes per foot to allow cutting or joining at 3 in. intervals without disturbing the bolting arrangement.

FlexAngle Corporation, 3760 Oakwood Ave., Youngstown, Ohio



Shawmut "t-d" Renewables have the best time delay characteristics of any renewable fuse. The t-d link gives maximum time delay protection in the higher current ranges as well as in the overload zone. Short-circuit operation is instantaneous, along with a reduction in the rate of rise of recovery voltage. The t-d link notches blow one after the other with rheostat-like action.

HIGH QUALITY - LOW COST

Precision-made. No soldered, welded or steel parts. Simple, sturdy, dependable. Easy to install, take apart or renew. Interchangeable links, renewable parts. Large silver-plated contacts. Adequate 2-way venting.

COMPLETELY RENEWABLE FUSE OR LINK

Complete fuses and/or renewal links are available for either 250 or 600 V circuits; in ferrule ratings, from 0-60 Amps.; in knife-blade ratings, from 70 to 600 Amps.

Order now or ask for t-d Bulletin 500 *U.S. Patent No. 2,560,138 © The Chase Shawmut Co. 1958



t. a - Awake At The Switch THE CHASE-SHAWMUT CO.

374 MERRIMAC STREET . NEWBURYPORT, MASSACHUSETTS

Subsidiary of I-T-E CIRCUIT BREAKER CO., Philadelphia, Pennsylvania

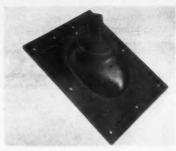












Fittings

(33)

Two conventional fittings for entrance masts are combined in the single Type RP aluminum roof plate and flashing. Cast fitting is one-piece aluminum for weather resistant, light weight and rigid mast support. Type RP are furnished with Duxseal or Neoprene hood for weathertight entrance closure. Sizes are available for 1½-, 1½-, 2-or 2½-in. entrance masts. Catalog data sheet is available.

M. & W. Electric Mfg. Co., Inc., East Palestine, Ohio

Condulets

(34)

A new line of watertight, NEMA 4, and weather resistant junction Condulets, Series W.JB, suitable for both indoor and outdoor use. A round Neoprene gasket prevents water from entering. Body is outside flange design, with four cast mounting feet. Three sizes are available: 4-, 6- and 8-in. in width. Walls can be drilled and tapped for conduit up to 2 ins., and brazed hubs can be added for larger sizes.

Crouse-Hinds Company, Syracuse 1, N. Y.

Motor (35)

A new weatherproof ac motor for use in "outdoor" type applications where the motor is subjected to extreme moisture or the elements, is now available in all standard speeds in sizes from one through 250 hp. The insulation system is completely non-hygroscopic. It features silicone sleeving, glass-mica slot liners and glass mat top-sticks and midsticks. The formvar wire coils are repeatedly immersed in special thermosetting, oil-and-water-resistant varnish, then sealed with a final coat of special red finishing enamel. The watertight conduit box is cast iron with a gasketed cover and threaded outlet.

Reliance Electric and Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

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New, current-type motor starting relays, Klixon 9660, are available in narrow differentials with stable pickup and drop-out ratings from as little as 1.01 amp maximum pickup (switch close)-0.86 amp minimum drop out (switch open) to as much as 24.4 amp maximum pickup-20.3 amp minimum drop out. Relays are for use on single-phase, ac, hermetic refrigeration motors and in place of centrifugal starting switches on other single-phase, ac motors of the split-phase or capacitor-start type. Units are small in size, fully enclosed in phenolic cases, contact ratings are 10 amps. Standard models in this series have either screw type or quick connect terminals and a variety of mounting brackets. Bulletin STR-3 is available.

Metals & Controls Corp., Spencer Div., Attleboro, Mass.

Conduit (37)

A new line of liquid-tight flexible metal conduit named "Sealed Skin". Designed to meet JIC requirements, it is used for waterproof electrical conduit applications, construction, heating and air conditioning equipment, and automated lines in many diverse industries. "Sealed Skin's" galvanized steel core made from continuous strip metal, is covered with a water-tight hide of polyvinyl chloride. Available in the following trade sizes: \(\frac{3}{4}\)-, \(\frac{3}{4}\)-, \(1\)-, \(1\frac{1}{4}\)-, \(1\frac{1}{2}\)-, \(2\)-, \(2\frac{1}{4}\)-, \(3\)-, \(1\)-, \(1\frac{1}{4}\)-, \(1\frac{1}{2}\)-, \(2\)-, \(2\)-, \(3\)-, \(3\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-, \(1\)-

International Metal Hose Company, Bellevue, Ohio

Meter Mounting (38)

New 200-amp socket meter mounting with provision for manual by-pass. This mounting has the Lewis designed, patented split cover which allows the regular method of mounting the meter, using the standard sealing ring which uses only one seal to seal the meter and cover in place. By this method of splitting the cover, the terminals below the meter are easily accessible to use a by-pass line. The terminals are located in the open to make it easy wiring and they have been tested to carry the current for the largest self-contained meter used on a 200-amp service. The size of the mounting is 17 ins. high, 10 ins. wide and 4 ins. deep.

Code Equipment Sales Co., 222 Kalos St., Philadelphia 28, Pa.



Republic ELECTRUNITE E. M.T. further proof that THE BEST



makes wire pulling up to 30% easier...

COSTS LESS INSTALLED

With Republic ELECTRUNITE® E.M.T., quality and economy go hand-in-hand. ELECTRUNITE E.M.T. is produced from highest quality flat-rolled open-hearth steel made in Republic's own mills and carefully inspected to meet Republic's rigid manufacturing requirements. The result is a tube with uniform ductilityductility that provides wrinkle-free bends without wall collapse . . . every time. It offers three other major installation advantages:

- Exclusive "INSIDE-KNURLING" ... "ball-bearing-like" surface that reduces friction, makes wire pulling up to 30% easier. Plus, pull-in, pullout wiring system economies for future loadbuilding expansion.
- Exclusive "INCH-MARKS" in feet and inches on sizes including 11/4" . . . reduces measuring and fitting time. Simply measure the length you need by "INCH-MARKS", cut to size, and install.
- "GUIDE-LINED" from end-to-end to keep bends in line, avoid costly "wows", wasted time, and wasted materials.

That is why Republic ELECTRUNITE E.M.T. was used throughout the construction of the new Lincoln Park Shopping Center, Lincoln Park, Michigan. W. D. Gale Company was the electrical contractor.

Republic ELECTRUNITE E. M.T. is produced to A.S.A. Specification C.80.3 and Federal Specification WW-T-806, latest revisions. Republic's ELECTRUNITE also carries the Underwriters' Laboratories Seal of Inspection.

Learn more about ELECTRUNITE economies. Call your Republic ELECTRUNITE distributor, or write today.



Keep production schedules on time! Republic ELECTRUNITE E.M.T. goes in easy, keeps ahead of concrete pour. Galvanized finish stays undamaged. No reduction of wall thickness. Lengths are joined using compression type couplings. No threads to cut! No runs to turn! No delays!



Smooth, accurate, wrinkle-free bends are easy to make when you use Republic ELECTRUNITE E.M.T. with the Republic Bending Tool. Simply place the bender at the proper "INCH-MARK" and apply pressure and you get a stub of the correct height. Full-length "GUIDE-LINE" keeps bends in the same plane, eliminates costly "wows", saves time and material.

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World's Widest Range of Standard Steels and Steel Products

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I would like to learn more about Republic ELECTRUNITE E.M.T. features and installation advantages.

Address

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(40)



Truly velvet in performance...
"Presswitch" responds to the gentlest
press of the finger, touch of the hand
or nudge of the elbow. It's the
smoothest, most convenient and most
efficient A.C. switch in Hubbell's
famous family of switches.

"Presswitch" is designed for all general A.C. applications, particularly the control of large fluorescent lighting applications. It is as much at

Cat. No.	Тура	Button Style
1251	Single Pole with thru-connection	Brown Nylon
1251-1	Single Pole with thru-connection	Ivorine Nylon
1252	Double Pole	Brown Nylon
1252-1	Double Pole	Ivarine Nylon
1253	Three-way	Brown Nylon
1253-1	Three-way /	Ivorine Nylon
1254	Four-way	Brown Nylon
1254-1	Four-way	Ivorine Nylon

CAT. NO. 1251-I
15 amps., 120-277 volts
Single Pole A.C. "Presswitch"
with thru-connection
and ivorine nylon button.

home in a factory as in a living room, for its attractive styling blends with any interior and its rugged precisionmolded construction represents a new standard of durability and dependable operation.

"Presswitch" fits standard wall boxes, accommodates standard wall plates and operates in any position. It requires no special wiring.

Complete information is yours on request.



In order to adapt the Thorex Dynagap lightning arrester to the requirement of many distribution departments, design features of two other distribution types have been combined in the new Type DV-S. This arrester is equipped with automatic ground lead isolator, plus a simple stud connection for the line terminal. The primary air gap is contained within the porcelain housing. Isolation of the ground lead is accomplished with a heatsensitive explosive rivet contained within the terminal assembly. Publication No. 1403-H is available.

Ohio Brass Company, Mansfield, Ohio



Clamp

A new wedge grip clamp No. 1060 for triplex service drops is made of stainless steel and heattreated aluminum. For use at the pole and house end of a triplex service drop, the clamp can be installed with line gloves on, as all parts stay together while handling the clamp. The 1060 clamp can be re-used.

Porcelain Products Inc., Carey, Ohio

Cutter (41)

A new cutter for copper, brass or aluminum tubing from ½-in. to 1½-in. O.D. Cutter wheel is in the spring-loaded, movable arm so that the cutter and tubing can be held in position with the left hand while the right hand tightens the screw. Cutter also features a machined and hardened reamer which snaps open or closed as needed. Bulletin TC1-9 is available.

Reed Manufacturing Co., Erie, Pa.

Generators (42)

Synchronous - motor - driven frequency changers with 400 cycle, 3-phase output are now available as large as 250 kw. One unit consists of a 150 kva, unity power factor, 120/208-volt, 3-phase, 4-wire, 400

cycle alternator mechanically connected in tandem to a 250 hp, 440-volt, 3-phase, 60 cycle, 1200 rpm synchronous speed drive motor. Both motor and alternator are dowelled to the structural steel base. Control cubical contains all necessary metering, circuiting, and synchronous motor starter for the motor. Literature is available.

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Kato Engineering Company, Mankato, Minn.

Bus Conductor (43)

Alcoa Universal angle bus conductor, UABC, is an L-shaped extrusion to provide a bus conductor that will adapt to normal cable lug connectors. Built into UABC is a set of shallow longitudinal grooves. On the outer surfaces of the bus, two extruded grooves locate the center points for drilling holes which receive a standard connector, or for direct connection to station apparatus. On the inner surfaces, a single groove locates the center line, so that the bus may be drilled to connect directly to insulators. Designed primarily for use in distribution type substations, it also can be used in substations for subtransmission voltages, and for primary distribution voltages. Although used normally where current ratings are in the 700-800-amp range, UABC in the 31 by 31 by ‡-in, size is rated at 1300 amps. Available in standard 25-ft lengths.

Aluminum Company of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.

Floodlights (44)

A new line of outdoor floodlights features a patented full-floating socket construction that insures a perfect weatherseal and positive electric contact with all makes of reflector lamps. By "floating" the socket in a cushion-spring cradle that adjusts automatically to variations in lamp sizes and shapes, common causes of premature lamp failures are eliminated. The line is made for medium or mogul base reflector lamps in 75 to 500-watt sizes and is accompanied by a wide variety of mounting devices for pole top or wall mounting singly or in clusters for wide area floodlighting. All units are weatherproof, corrosion-proof, heavy-duty cast aluminum, and are fully UL-approved and CSA-approved for outdoor weatherproof service.

Stonco Electric Products Co., Kenilworth, N. J.



Combination Starters—a single mounting plate containing magnetic starter and disconnect for economical installation. Combination unit is used for all types of enclosures as well as an open unit for panel mounting. All Furnas Combination Starter enclosures feature external mounting feet for simplicity and accessibility.





Push Buttons for every need—Standard, Heavy-duty and Oil Tight. Choice of either front or back mounting. Furnas standardization and interchangeability mean more variations with fewer parts. Complete accessory line.



Drum



Pressure



Limit



Foot

For full information write for Catalog 5800, 1067 McKee St., Batavia, Illinois A38



FURNAS ELECTRIC COMPANY
BATAVIA, PLLINOIS
SALEE REPRESENTATIVES IN ALL PRINCIPAL CITIES

pick up the phone...

... IT'S FOR YOU!

In home or office, school or hospital, today's efficiency is measured in terms of swift communication.

The location of a Couch
Private Telephone at strategic points
within a building is an effectual way of
making working hours count for more.

Whether in admitting a visitor, summoning an associate, or consulting with a remote department, this internal telephone system brings immediate results in promptness, in time saving, in the elimination of countless extra steps, and in overall economy.



Couch manufactures a variety of systems to cover requirements ranging from two stations up to 200. Designed as self-contained inter-communication units, Couch Private Telephone Systems provide consistent service and satisfaction.

Write for Bulletin 133.

Simplified Systems of Communication

SIFICOUCH

3 ARLINGTON STREET

NORTH QUINCY 71, MASSACHUSETTS



Control

(45)

A new system for remote or automatic control of HPL-C metal enclosed interrupter switches. System, employing positive pneumatic switch actuation, can be incorporated on the line of HPL-C switches from 600 through 2000 amps and 2.4 through 14.4 kv. Consisting of a double-acting air motor, linkages, solenoid valve and air cylinder, the system permits three principal types of operation: remote pushbutton control; automatic throwover schemes; and circuit opening on overload with thermal or overload relay sensing. They provide reliable switching and fault protection for primary voltage distribution systems in industrial plants, institutions, schools and airports. Switches are available with enclosures for either wall-mounting or free-standing applications.

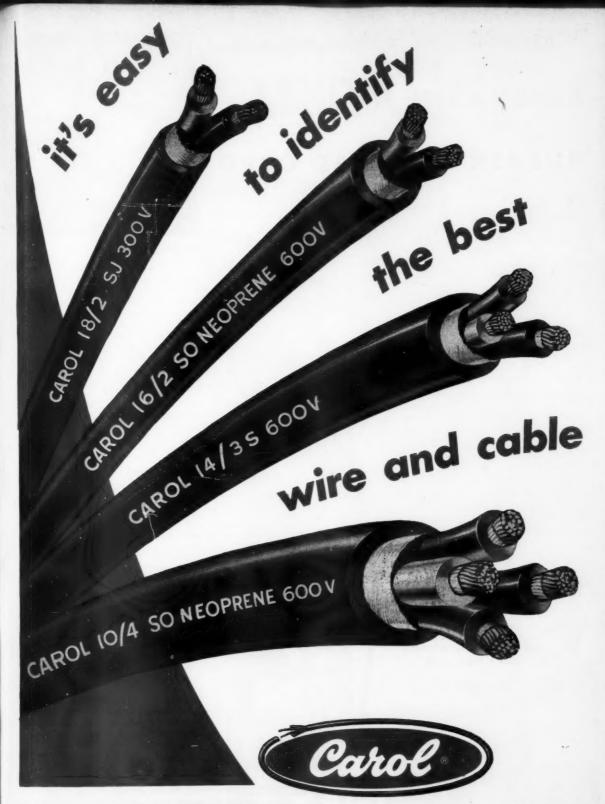
R&IE Equipment Division, I-T-E Circuit Breaker Co., Greensburg, Pa.

Instruments

(46)

Two instruments, Types CF-7 and CH recorders, have been combined in a new hook-on recording volt-ammeter, designated Type CH-7. It couples the butyl-molded hook-on transformer of the CF-7 with the fast response time and numerous chart drives of the CH recorder. Other features include a direct-writing ink system, portable case, and accuracy within 2%. Six current ranges and three voltage ranges afford wide application for the CH-7. Ranges are 15/30/75/ 150/300/750 amps for ac 60-cycle current and 150/300/750 volts for ac 60 cycle voltage. The 6-in. wide chart is 150 ft long with a 41 in. calibrated width marked 0-15.

General Electric Co., Schenectady 5, N. Y.



CAROL CABLE COMPANY • Division of the Crescent Company, Inc., Pawtucket, R.I. • Portable Cords • Cordsets • Lamp Cords • Welding Cables • Thermostat Wires • Power Supply Cables

Contractors and maintenance men

DEPEND ON ROYAL

RUBBER JACKETED CORD





Floodlights

(47)

(48)

Model III MUA floodlights, combined with two bracket arms and three bases, provide a choice of seven different mountings. They may be mounted on pipe or on horizontal or vertical surfaces, and are available in open and closed types. Various models are suitable for long, medium, and short-range floodlighting, and are recommended for industrial and sports lighting uses. All take 750-1000-1500-watt, PS-52 bulb, general lighting service lamps.

Crouse-Hinds Company, Syracuse 1, N. Y.

Electric Plant

A city water cooled electric plant of 100 kw capacity. Listed as Model 100C74, 100 kw, 240/480-volt, ac, 3-phase, these new plants are available with either city water or radiator cooling and for gasoline or city gas.

Kohler Co., Kohler, Wis.

Stringing Machine (49)

A combination tension stringing machine and straddle reel dolly that carries its own reel and also pays out the wire under controlled tension is especially designed for use in small areas. Known as the Pengo Model 5000-STR-I, it takes reels up to 34-in. by 72-in. weighing up to 5,000 lbs and employs the same Neoprene-lined bullwheels as do all other 5000 series Pengo tensioners which permit stringing all kinds and sizes of conductors up through .96 in. diameter under continuous tensions up to 2,000 lbs. For convenience in changing wire sizes between jobs, a hand rewind device is incorporated into the machine.

Petersen Engineering Co., Inc., Santa Clara, Calif.



Knurled inner surface of E



Rigid Hot-Dip Galvanized



Rigid Steel conduit ename

Steelduct Conduit

OFFERS THESE SPECIFIC COST CUTTING ADVANTAGES

- · Prompt deliveries through conveniently located distributors.
- High quality protective finishes resist rough shipping and storage conditions . . . will not flake or crack in bending.
- Conduit threads are protected against rust . . . cut storage losses and on-the-job labor.
- Smooth inner finish makes wire pulling easy ... EMT has extra feature in friction-reducing knurled surface. Wiremen bend Steelduct to any degree without splitting continuous weld-
- Order Steelduct for your next job. See how these features add up to a subtraction from your costs.

THE BLUE BEND-ALINER STRIPE allows quick, accurate alignment of bends. Combined with a Steelduct Benfield Bender it makes tough runs easy.



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THE STEELDUCT COMPANY

REPUBLIC STEEL BUILDING

YOUNGSTOWN, OHIO

4 new ideas in power distrib



New Switchboard

For 600-volt, maximum service, 50-100,000-ampere short circuit rating

Standardization is the keynote in this new Type DR switchboard. Standardization provides greater flexibility, easier installation and more maintenance features than ever before—at lower total cost.

Standardization, for example, enables the DR to incorporate any combination of seven protective devices—fusible or circuit breaker types—with complete interchangeability.

Standardization allows units or whole sections to be added, interchanged or removed—quickly, easily—in the field, as load conditions change, and with minimum time and effort. Pre-drilled, pre-formed modular framework and bus bars virtually eliminate the need for field drilling.

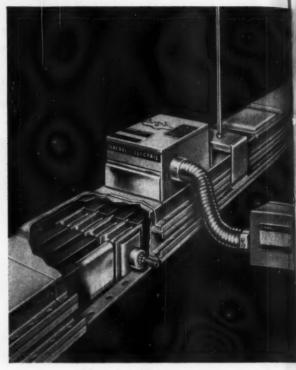
For installation and maintenance ease, standardized, centrally located horizontal main busing leaves the top and bottom of the DR clear for busway or cable entrance. No braces or bars to interfere with wiring. All terminals are easily accessible. Ask for a copy of Bulletin GEA-6627.



DR SWITCHBOARD EXTRA VALUE

New stud assembly. Eliminates wire bendingallows "straight-in" wiring—opens up more work ing space to speed installation. Stud assemblies are mounted on a strong, light-weight, non-magnetic aluminum barrier which minimizes heating.





New Busway

ampere for ampere, the smallest, lightest, most efficient and rugged ever designed

New Type DE busway is a totally enclosed plug-in busway with 50,000-ampere short circuit capacity as standard. It is rated 25-1000 amperes, 600 volts maximum, 3 pole or 4 wire, 3 phase. New Type DE busway incorporates all 22 features that engineers, contractors and users say are important in busway design.

DE, for example, installs with unmatched ease. It is up to 50% lighter and 30% smaller than other busways of comparable rating; approved for hanging on 10-foot centers in any position. Sections are electrically joined—quickly, simply—by means of a unique one-bolt, vise-like mechanism that maintains positive electrical custact between conductors with a ton of force. And DE's miniaturized fittings virtually eliminate the need for custom engineering. Result: 30% average saving in installation cost and 10% over-all.

For flexibility, twelve plug outlets come in each 10-foot length. For extra safety, each outlet is virtually dead-front and traveling arcs are essentially eliminated—thanks to Butyl insulation which is extruded over the full length of each bus bar, overhanging hupplug openings. Ask for a copy of Bulletin GEA-6173.



DE BUSWAY EXTRA VALUE

DE busway's telescoping length allows one foot adjustment (between 36 and 48 inches) precluding need for exacting layout, custon engineering, or special fabrication.

See your G-E representative or distributor for complete information. You may also obtain complete information on this equipment by writing to General Electric Company, Distribution Assemblies Department, Plainville, Conn.

ution offer more for the money



New Control Center

conserves space, costs less to install, saves money in operation

New compact Type DA7093 Motor Control Center provides an economical, centralized control of A-C motors, up to 200 hp at 600 volts (100 hp at 240 volts).

Compared with individual motor control, initial equipment investment with Type DA7093 is usually substantially lower. At the same time, the '93 affords convenient, economical plant operation and low maintenance. And when load requirements change, the '93 is easily expanded to meet them with standardized plug-in control units in NEMA sizes 1 through 5. Other components, such as meters, instruments, relays and panelboards can be built-in to meet specific needs.

Location of main buses at center of section allows wide, unobstructed pull-box space at top and bottom for easy wiring. Bus bars are silver-plated for positive electrical contact and edgewise mounted for optimum short circuit strength. Standard main bus ratings are 600 or 1200 amperes. Bus bars are braced for fault levels of 25,000 or 50,000 amperes. Ask for Bulletin GEA-6367A.



New Busway

100-ampere plug-in design hailed as the "Wiring Method of Tomorrow"

Now, a plug-in busway that costs no more installed—and usual substantially less—than wire and conduit!

Or as a leading electrical contractor in Wilmington, Delawar puts it: "With Type DH, I can save 25% over the cost of condu and wire when there are four or more tap-offs in the system."

Type DH—rated 100 amperes, 3 pole or 4 wire, 3 phase, 6 volts maximum—serves as either a feeder or plug-in system at may be used wherever exposed wire and conduit might be applie Light, sturdy and small in size (in cross-section not much larg than a pack of king-sized cigarettes), DH may be hung edgewise a 10-foot centers. Eighteen dead-front outlets are provided in ear 10-foot length. For added flexibility, each outlet accepts a variety fusible, no-fuse and circuit breaker plugs.

G-E distributors, nationwide, stock Type DH, including its wiveriety of fittings and accessories. So DH matches wire and condition availability as well as cost. Ask for Bulletin GEA-6172.





DH BUSWAY EXTRA VALUE

Telescoping length adjusts between 42 and 5 inches. This, plus flexible fiftings, eliminates need for exact measurements. Rigid fittings-elbows crosses and tees-adapt busway to virtually any building contour.

GENERAL EBELECTRIC

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way with ated 225ase. New eers, con-

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Cast Aluminum Quality

mcPhilben's 32-88 square ceiling unit is UL-approved for two 100 watt lamps. Its clean, modern lines, combined with maintenance-free operation, make it the ideal choice for institutions and industry: corridors, lobbies and lavatories.

The 32-86's face plate is of solid cast aluminum with a gleaming satin finish. Corrosion resisting construction features a reinforced and insulated back plate of zinc-clad bonderized steel. The cast carrara glass bowl swings to one side for easy cleaning. Available with mcPhilben's exclusive one-plece cast aluminum hinged guard. Also in vaportight 43-88 series.

Ask your nearby mcPhilben representative for full details. See our insert in Sweet's file 32a/mc or write for data sheet.



Corridor Light

All-Brite's new corridor light is a one-piece fully framed plastic diffuser with particular application to narrow-area illumination. Plastic diffuser totally encloses the entire fixture. Comes in two rapid-start models, 39148RS which takes a single 48-in, lamp, and 39108RS which takes two 48-in. lamps end to end on one 8-ft channel. Fixture may be used individually, or mounted on ceiling or stems in continuous rows. Diffuser is hinged on both sides for immediate replacement of lamps. UL approved. Catalog is available.

Fluorescent Fixtures of California, 352 Shaw Road, South San Francisco, Calif.

Transformers (51)

A completely redesigned line of single phase pole type distribution transformers in sizes from 3 to 167 kva, 18 kv and below. The improved electrical characteristics were obtained by the use of a new core and a new coil. The core-and-coil framing structure holds the unit in position under all conditions of handling and operation. The redesigned bushings are internally clamped and have connectors which are tincoated and large enough for the ACSR equivalent of the copper sizes specified by EEI-NEMA standards.

Moloney Electric Company, St. Louis, Mo.

Floodlight (52)

New Type MDB-10 pump island floodlight is a weatherproof lightweight luminaire with a hinged door. Mounted on the pump island, it may be used to light driveways, building surfaces, or general areas. Furnished with 2 ft of 2-conductor rubber-covered cable, the floodlight takes 200-300-watt medium screw base general service lamps.

Crouse-Hinds Company, Syracuse 1, N. Y.

Clamp (53)

A newly designed distribution clamp for use with distribution size conductors of copper, aluminum and ACSR. Clamps are made in three sizes to accommodate a range of conductors from 6 to 1/0, from 2 to 4/0 and from 1/0 to 336.4-strand, solid and ACSR. Other features include a single hex-head bolt connection with similar nut; conductor range stamped on each clamp.

Available with or without factoryapplied inhibitor compound. Clamps with inhibitor compound are individually packaged in polyethylene bags. Folder P158 is available.

Reliable Electric Co., Franklin Park, Ill.

Lighting Fixture (54)

A surface-mounted recessed fixture, called the "Rola-Lite", is suitable for both new construction and remodeling work. The spherical rotating eyeball provides simple directional adjustment over full 360°, with vertical tilt of 45°. It is made in both 75-watt (R-30) and 30-watt (R-20). Choice of decorator finishes includes triple satin chrome plates, satin brass plated, and painted eggshell.

Markstone Mfg. Co., 1531 North Kingsbury St., Chicago 22, Ill.

Field Office (55)

A new mobile contractor field office is maintenance-free, fire-safe and theft-proof. The under-carriage can be removed in minutes and when office is securely anchored, will withstand 100 mph wind load and unlimited snow load. Field office may be purchased in two forms—one in a knockdown kit form and the other as a fully factory assembled, wired and painted model "ready-to-roll", for shipment or pick up at the factory.

Wheaton National Sales, 228 East Park Ave., Wheaton, Ill.

Trencher (56)

Addition of the Auburn Gear-Draulic trencher to the list of power-matched attachments for the Work Bull 202 industrial tractor has been announced. Rig digs up to 600 to 800 ft an hour, compensates automatically for varying ground conditions, and handles trenches up to 6 ft deep in 6-, 8-, 10-, 12- and 14-in. widths. Depth control is regulated by a 2-way hydraulic valve, and all operations are controlled from the driver's seat. Variable speed and power control is provided by the Gear-Draulic drive which permits the rig to compensate for changes in ground condition. Trencher can dig straight down from the starting position, or can back-trench underneath sidewalks, streets and other obstructions.

Massey-Ferguson Industrial Division, 1009 South West St., Wichita, Kansas.



with the quality PLUS of the GOLD SEAL name

A high natural-tree rubber content, and rigid laboratory controls, assure a quality tape of lasting tack and fusion, with high dielectric properties for finishing an insulating splice.

Jenkins GOLD SEAL A.S.T.M. SPEC-IFICATION Tapes exceed the requirements specified by utilities. Available in two handy roll sizes – cellophane-wrapped and boxed, or cellophane-wrapped only.

Wherever exacting requirements are to be met, you can depend on GOLD SEAL SPECIFICATION Friction or Rubber Insulating Tapes.

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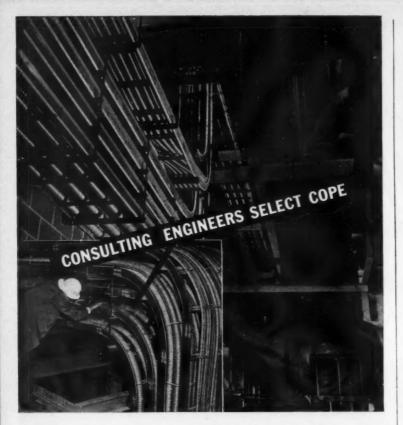
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GoldSeal Tape

Product of JENKINS BROS. Rubber Division 100 Park Avenue New York 17,

(58)



"MILES OF SAVINGS" RIDE ON COPE CABLE LADDER

Over two miles of Cope aluminum cable ladder support countless miles of aluminum interlocked armored cable at the first unit of Metropolitan Edison Company's new Portland generating station, currently rated at 165,000 KW. Ultimate capacity is expected to be approximately 1,000,000 KW. Selection of Cope cable ladder by Gilbert Associates, Inc., consulting engineers, permitted necessary system flexibility and ease of installation . . . at cost savings and quality not possible with other available methods and materials!

ASK FOR PROOF FROM COPE

Other manufacturers can only talk about your system requirements—Cope is prepared to prove Cope system performance with accurate technical data, load deflection tables, actual heating tests, etc. Whenever you ask about cable supporting equipment ask for proof!Cope has it.

System Layout No Problem

Cope cable ladder combines main stringers of "Z" section aluminum with slotted rungs at specified intervals for securing of cables. Strong, yet lightweight,

ROME CABLE CORPORATION

it is easy to handle, easy to install—even in the most cramped quarters. Cope's complete line of fittings and accessories permit required changes in direction, elevation or other conditions of system layout. Cope's pin-type coupler joins ladder straight section and/or fittings in seconds ... permits easy connection to other Cope systems ... expanded metal wireway (trough) and cable channel. Every Cope system is complete ... no hardware or other extras to buy later.

Cuts Costs Three Ways

A single run of Cope ladder or wireway supports as many cables as several runs of conduit. From the start, you save in materials and labor costs... keep space requirements to a minimum! An easy-toget-at Cope system cuts maintenance costs, too... permits ready re-routing of existing cables or adding of new cables in the future. All Cope cable supporting equipment is available in aluminum or hot dip galvanized steel construction.

Contact your authorized Cope distributor . . . or write to T. J. Cope Division, Rome Cable Corporation, Collegeville, Pa.

PE Division

Liquid-tight connectors feature unique "Uni-Seal" design for speedy installation. The 4-part "STN" connectors consist of a compression nut, patented brass ferrule, connector body, and insulated throat wedge adapter. Adapter incorporated in the fittings grips the wiring or junction box wall when tightened. When screwed in position, the continuous metal-to-metal pressure of the wedge adapter and the connector body against each other and the box wall assures re-

Appleton Electric Company, 1701 Wellington Ave., Chicago 13, Ill.

Generating Set

sistance to vibration.

A new 125 kw, 156 kva, 1800 rpm, electric-gasoline generating set has been added to this line. Unit is particularly adaptable for standby emergency service, or seasonal continuous duty. Unit incorporates a revolving field-type external regulated generator of single bearing design, complete with windings, and direct connected exciter, directly fastened on a common heavy steel bed plate and driven by means of a semi-flexible coupling by a Hercules Mode HXE, 6 cylinder, 4cycle gasoline engine. Engine is also available with natural gas and propane carburetor. Unit is available in both single and 3-phase.

Katolight Corp., First Avenue at Chestnut St., Mankato, Minn.

Fire Alarm Station (59)

A new single station fire alarm for use in schools and hospitals. The pull-lever is normally flush with the cover and of a design which prevents false or unintentional alarms when struck by an object or brushed against by a person. After an alarm has been initiated, the pull-lever cannot be restored to its flush position and serves as a flag to give visible indication that station has been operated. It may be operated as a breakglass station or the glass rod may be omitted and station operated as a non-breaking station. It is available in two types: Model 700 for use with either non-code continuous ringing fire alarm systems or master code system; Model 705 pre-signal station is for use with pre-signal systems, which are generally used in hospitals. Both models are listed by UL.

Standard Electric Time Co., 89 Logan St., Springfield, Mass. NOW ...

double barreled performance

WITH THE ALL NEW AMP UTILI-TAP TEAM

The unique double barreled UTILI-TAP connector and matchmated tools offer a completely new and easy way to secure conductors at both ends of the service drop, at transformers and loop splices. No loose-piece hardware to fumble with, no periodic tightening or arm-wearying tooling. The UTILI-TAP team means maximum performance and long life, with greatest ease of application.

The UTILI-TAP Connector features:

- exclusive double barreled locking crimp—to guard against relaxation under varying load conditions
- tin-plated to resist corrosion and assure optimum electrical connection
- pre-inhibited with non-flow compound to remove oxide from aluminum conductors

The UTILI-TAP Tool features:

- crimping dies are permanently attached to tool head for quick die change
- open type head for easy access to conductor and quick release after application
- · portability-lightweight (less than 8 lbs.)
- for wire size range 8 through 4/0 AWG—solid, stranded and ACSR—in all copper and aluminum wire combinations

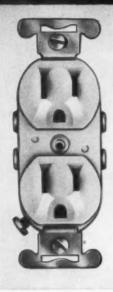
For more information on the double barreled UTILI-TAP method, write:





GENERAL OFFICES: 181 HILLCREST AVE., HAVERTOWN, PA.

EXCLUSIVE DISTRIBUTORS FOR AMP PRODUCTS TO THE UTILITY INDUSTRY





No. 5096 **Duplex U-Ground** Parallel receptacle

LOOP IT OR DO IT THE EASY WAY! LEVITON back-and-side wired devices offer two types of connections. Loop it the standard way, or clamp it for back-wiring—the new simple and modern way that gives you a connection that is electrically right and mechanically tight. Either way you are assured the right kind of power to carry heavy duty loads. Here is the maximum in performance at minimum cost . . . with absolutely no compromise in quality!

Back-and-Side Wired Devices Now Available: Rated 15A.-125V. (No. 5089 15A.-250V.)









No. 5074



No. 5088

No. 5089

Just Check These Features:

- · All devices have double-wiping phosphor bronze
- · Plaster ears-wide and break-off types.
- · Grounding Screws on all U-Ground devices.
- Entire assembly solid-riveted for permanence.
- · Heavily sectioned molded phenolic bases.
- · Full underslung straps, completely rust-proofed.
- · Easy back-wired installation for up to No. 10
- · Strip gauge for obtaining maximum clamping.
- · Individually packed with mounting screws attached to straps.

Meet U. L., C.S. A., and Federal Specifications All back-and-side wired devices in brown and ivory.

LEVITON MANUFACTURING COMPANY, INC. Brooklyn 22; New York



Chicago · Los Angeles · Leviton Canada Limited Montreal

For your wire needs, contact our subsidinty AMERICAN INSULATED WIRE CORP

Lighting Fixture

A new 24-in. high-bay lighting fixture for use with mercury vapor lamps. They meet the NEC standard for 1000-watt mercury vapor lamps, are precision-designed with a vented hood for lower operating temperatures and minimum dirt accumulation. Engineered for large industrial interiors and high-bay plant areas, the fixtures provide a choice of concentrated or spread type lighting design. They are available in 1-piece socket type, or in 2-piece "Diskonect" style which permits both lamp and reflector to be removed as a complete unit without disturbing the wiring. Reflectors are of Alzak processed alumi-

Appleton Electric Company, 1701 Wellington Ave., Chicago 13, Ill.

Industrial Fixtures

New industrial fixtures that use the very high lumen output of the Power-Groove lamps. They are available with approximately 15% uplighting, PF series, and 25% uplighting, PV series; the uplighting is directed through scientifically designed apertures that are collared for extra strength. They may be purchased with louvers for 30° by 30° shielding on the PV series, and 16° by 30° on the PF series. Available with porcelain enamel or white supercoat baked enamel ribbed reflectors, units may be mounted, individually or in continuous rows, by any conventional method. Reflector couplings are plastic inserts, sealing light leaks.

Smithcraft Lighting, Chelsea,

Heating and Ventilating

Two new companion heating and ventilating units for school classrooms. One warms and recirculates inside air as controlled by room or zone thermostat; the other draws in outside air continuously as determined by code requirements and warms it depending upon the inside-outside temperature differential. Units provide a range of heating and ventilating capacities to meet the demands of different codes and different weather zones by offering interchangeable cast aluminum safety grids with capacities up to 6000 watts. Matching shelving and wireway base are also provided for continuous below-sill level installa-

Electromode, Division of Commercial Controls, 570 Culver Rd., Rochester 9, N. Y.

New Concept in Construction Fastening!

REMINGTON

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Power-Mate BASIC UNIT



vent free flight of studs when base material is tool. Handles 80% of your fastening in con-inadequate. Used with "Power-Mate," this Is safest Stud Driver ever designed. Remington Studs and 22 caliber Power Loads. Remington Studs and 22 caliber Power Loads. top performance . . . economically.

K-1. CAPTIVE STUD KIT-designed to pre- K-2. LIGHT-DUTY KIT-produces all-purpose K-3. MEDIUM-DUTY KIT permits use of %" diameter Remington Studs with low-cost 22 caliber Power Loads. This assembly gives

toughest fastening jobs. Designed for use with %" diameter Remington Studs and scientifi-cally graded 22 or 32 caliber Power Loads.



Most versatile tool ever designed for fastening wood or metal to concrete or steel

Now you can have the power you want, the stud size you need with the new Remington "Power-Mate." The tool is easy to use. Just a squeeze of the trigger is all it takes to anchor wood or metal sections to concrete or steel. No pre-drilling, no outside power connections required!

The Remington "Power-Mate" is flexible, too. Permits use of 1/4" or 3/8" diameter alloy steel studs and 22 or 32 caliber Remington Power Loads to furnish driving force.

Take the "Power-Mate" Basic Unit, attach the Stud Driver Kit of your choice—and the tool is ready to use! It will handle any fastening job-light, medium or heavy duty. That's why the Remington Stud Driver is the most versatile construction fastening tool ever designed!





STUD DRIVER

*"POWER-MATE" is a trademark of Remington Arms Company, Inc. Remington Arms Company, Inc. Industrial Sales Division, Dept. EC-9 Bridgeport 2, Connecticut Please send free booklet on the Remington "Power-Mate." ☐ I am especially interested in the Captive Stud Kit. Address



with the ORIGINAL "Electrimatic" Chuck

GUARANTEED TO GIVE YOU THE MOST PRODUCTION AT LOWER COST!

Completely eliminates manual chucking! Grips forward or reverse—the instant you flip the switch. Trouble free! The last word in operating simplicity! Precision built! Adjustable for "tight or light" grip, for hard or soft material. (1/8" to 2" pipe or rods.) Available on the fast and famous, rugged, lightweight Beaver Speed-O-Matic or the super-fast, powerful and rugged, productionpacked Beaver Model A.

You must have tops in performance and production to survive in today's competitive market. So, Buy Beaver - Now.



See your Beaver distributor today, or write Beaver direct!

Beaver Pipe Tools, Inc. 279-500 Dana Ave. • Warren, Ohio

Product Briefs

(63) A new portable masonry drilling machine with water feed to diamond bit has been announced by Diamond Core & Saw, division of Portomag, Inc., Detroit, Mich. ... (64) A new Drive-It Model 77 powder-actuated concrete and steel fastening tool has been introduced by Omark Industries, Inc., Portland, Ore.

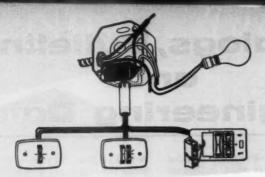
(65) Slaughter Company, Piqua, Ohio, has announced a new Model 103-MP automatic high voltage insulation tester (66) A new room thermostat, Type B59, is being offered by United Electric Controls Co., Watertown, Mass. It is suitable for homes, apartments, motels, hotels, institutions, factories and industrial buildings (67) Electric Controls, Inc., Wales, Wis., has developed a new vehicle mounted, 110-volt generator, Model

DSD 1000 "GenerAC".

(68) Broadway Contracting Co., Inc,. Fort Wayne, Ind., has introduced a new dispenser for all types of nominally sized wires and cables. It is called "The Reel McKoy" system (69) A Mobilite trailerized flood lighting unit that generates its own electric power has been introduced by Pacific Mercury, Van Nuys, Calif. ... (70) A new water-reducible insulating varnish has been introduced by the Sherwin-Williams Co., Cleveland, Ohio. The trade name is Ajax Emulsion Insulating Varnish.

(71) Hykon Manufacturing Co., Alliance, Ohio, has announced a light-weight portable metal reel. called "Tota-Reel", which handles small rope, cable, wire and various flexible plastic materials..... (72) Beaver Pipe Tools, Inc., Warren, Ohio, has introduced a new nonspiral clear vue pipe cutter (73) Jay Lighting Mfg. Co., Inc., New York, N. Y., has introduced the Coronet Series of ceiling fixtures and wall sconces.

(74) A new type of pipe cutter, which cuts soil pipe, field tile, Transite, or Duriron, has been announced by Wheeler Manufacturing Co., Ashtabula, Ohio (75) Electric Cord Company, New York, N. Y., has designed a new automatic emergency light for outdoor use, called Light Warden Chargomatic No. 300. . . . (76) Anderson Electric Corp., Birmingham, Ala., has developed a new line of neutral compression splices and "L" taps for use with \{-in. crimping dies.



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REMCON

remote control switching with
* pilot-lite indication

EASIER TO WIRE

REMCON means simpler wiring. Since a separate low-voltage power source does not have to be installed in the attic or basement, you simply hook the three wires of the relay to the three terminals of the switch. It's that easy!

EASIER TO SELL

REMCON provides modern, adequate switching ... multi-point, light-path remote-control and master-control switching ... features that are evident throughout the house. And REMCON'S handsome Hi-Fashion switches with Velvet Touch add richness to the decor of every home.



only REMCON

has these features:

- 1. Built-in transformer means unit control... Each relay in the REMOON method operates independently from and has no effect upon other relays.
- "Pilot-Lite" indication without using additional wiring or
 transformers. Substitute
 REMCON "Pilot-Lite" relays
 and switches for standard...
 the "Pilot-Lite" circuit employs the same three wires
 used for wiring switch to
 relay.
 - Ideal for 8-way or 4-way switching. REMCON's complete flexibility means greater economy, broader application...

- elimination of external transformer makes installation of even one switch and one relay practical.
- 4. Operates silently...No annoying magnetic relay hum.
- 5. Unique 6-volt method replaces heavy armored cable with light, pliable \$18 wire, making handling and stripping easier ... and with only 6 volts at the switch, REMCON is as safe to use as the family flashlight.
- Extra safety features built in ...cannot burn out if lowvoltage switch legs are shorted for extended period.

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WIN THIS VOLKSWAGEN SERVICE TRUCK



FREE to the man who submits the most imaginative and practical use of REMCON on actual installation. FOR FREE ENTRY ENVELOPE WITH ENTRY BLANK, FULL INFORMATION AND HELP-FUL SUGGESTIONS, see your SHMCON distributor or send this coupon.

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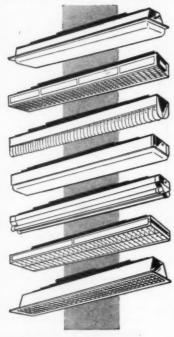
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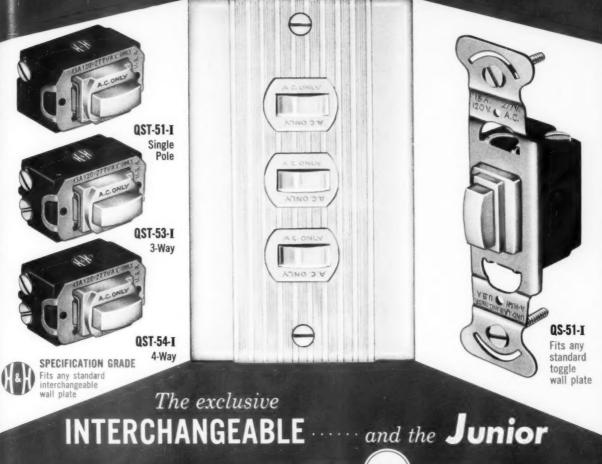


Catalogs, Bulletins and Engineering Data

- (77) CONTROL PANELS, designed and fabricated to meet individual requirements for electrical, electromechanical, pneumatic, or hydraulic controls and instrumentation, are described in new folder. Turbo Machine Co.
- (78) METER MOUNTINGS. New 6-page folder No. 71 describes line of socket meter mountings rated at 100, 150 and 200 amps for single and gang mounting. Code Equipment Sales Co.
- (79) POWER CABLE. 8-page folder describes Hyvolt cable, with engineering specifications and dimensions and weights. Crescent Insulated Wire & Cable Co., Inc.
- (80) SYNCHRONOUS MOTORS. Bulletin GER-1520 describes methods of starting various types of synchronous motors, with discussion of operating characteristics affecting control selection and application. General Electric Co.
- (81) GROUP RELAMPING. Booklet describes plan based on lamp performance to enable stores, offices, industrial plants, and other uniform customers to accurately predict when lamps have reached the end of their economic life. General Electric Co.
- (82) UNDERFLOOR DUCT. 8-page Bulletin 484 includes detailed dimensions, various types of junction boxes, ducts and accessories for underfloor distribution system. Spang-Chalfant Div.
- (83) LOW-VOLTAGE SWITCHING brochure features the design, specifying, planning, installing and trouble-shooting of low-voltage relay switching system with ideas for commercial applications. Touch-Plate Mfg. Corp.
- (84) HIGH-POTENTIAL TESTERS. New Bulletin 5-1.2 details full specifications and specific application data of Hypot models covering output ranges of 5, 10, 20 and 30 ky dc. Associated Research, Inc.
- (85) LIGHTING FIXTURES. Complete line is described in four sections: commercial fluorescents, troffers, industrial fluorescent, and industrial incandescent. 112 pages. Electro Lighting Corp.

- (86) ELECTRIC PLANTS—how to choose the right one. 4-page folder lists minimum wattages required for various sizes of working crews using portable tools. D. W. Onan & Sons, Inc.
- (87) SPEED MEASURING instruments. Bulletin 35 lists wide selection of speed indicators, tachoscopes and tachometers in ranges and types for applications in all industries. 18 pages, James G. Biddle Co.
- (88) WIRE MARKERS. 8-page catalog of pressure-sensitive wire markers illustrates a wide variety of designs for use with all types of wire and cable. North Shore Nameplate Inc.
- (89) LOAD BREAK SWITCHES. 8-page Bulletin 558 provides results of tests on 2000- and 4000-amp, 240-volt switches. Tests included short circuits, repeated load breaks, and repeated closings against available rms currents up to 130,000 amps. Pringle Electrical Mfg. Co.
- (90) FLUORESCENT SIGN LIGHT. Combination brochure and spec sheet describes new LINE-O-LITE fixture for billboards, highway signs, store entrances, building fronts or parking areas. Magni-Flood Inc.
- (91) TIME SWITCHES. Bulletin GEA-6681, 12 pages, describes three types of time switches, including design features, specifications and applications. General Electric Co.
- (92) MOTOR-STARTING RELAYS. 4-page folder describes current-type Klixon relays for use on single-phase, ac hermetic motors. Metals & Controls Corp.
- (93) INSULATORS and hardware commonly used on electrical distribution systems, including dead-end clamps and line post insulators, are described in 12-page Booklet 1396-H. Ohio Brass Co.
- (94) ALTERNATORS, permanent magnet type. Circular E-10 gives electrical characteristics, weight and dimensional information on Nobrush alternators, ratings from 250 va up to 10 kva, 400 cycle. Georator Corp.

Now ... Two New Switches



...that complete the ARROW (AH) HART



The Arrow-Hart Quiette Tap Action Switch taps on or off with the gentlest pressure of finger-tip, hand or elbow anywhere on the button — truly electrical convenience at its finest. And now, addition of these two new switches — the small, compact Junior and the exclusive Arrow-Hart Interchangeable-makes Arrow-Hart the first and only complete line of Tap Action Switches available anywhere.

Featuring quiet mechanical operation, Arrow-Hart Quiette Tap Action Switches are constructed to insure long life and maximum electrical efficiency. They operate on full voltage without relays and provide safe control for incandescent or fluorescent lights and household appliances. Here, in fact, are tomorrow's switches . . . available today!

See reverse side for more information ...

Completing our Tap Action Line...



2 NEW ARROW AH HART (Juiette TAP ACTION SWITCHES

20 AMPERE







QST-203 SPECIFICATION GRADE

Fits any standard interchangeable

Dimensions are the same for all Interchangeable Tap Action Switches

THE ARROW-HART INTERCHANGEABLE () uiette

TAP ACTION SWITCH

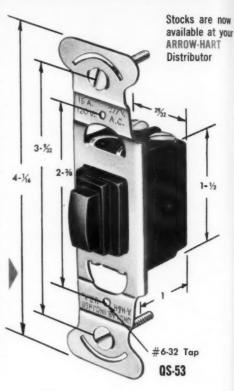
. . . is the only switch of this type now available. It is available for 15 or 20 ampere operation at 120-277 volts, ac only. Switches are totally enclosed, have heavy silver alloy contacts, and can be installed in any position. Meeting Federal Specification W-S-893-A, they are approved for control of incandescent or fluorescent lights to full rated capacity and can be used to control motors where full load current does not exceed 80% of the current rating of the switch. Supplied with binding screw type terminals. H&H Specification Grade.

THE ARROW-HART

Junior ()uiette

TAP ACTION SWITCH

. . . was developed to provide convenient, quiet operation at a lower cost than our Senior Tap Action Switch. The Junior Switch meets Federal Specification W-S-896-A and is rated at 15 amps, 120-277 volts, ac only. Supplied with binding screw type terminals.



15 AMP., 120-277 VOLTS A.C.

CATALO	G NO.*	
15 Amp	20 Amp	DESCRIPTION
QST-51	QST-201	Single Pole
QST-52	QST-202	Double Pole
QST-53	QST-203	Three-Way
QST-54	QST-204	Four-Way

INTERCHANGEABLE 120-277 VOLTS A.C.

TALOG NO.*					Т
р	20 Amp	DESCRIPTION	CATALOG NO.*	DESCRIPTION	
	QST-201	Single Pole	QS-51	Single Pole	_
2	QST-202	Double Pole	QS-52	Double Pole	
3	QST-203	Three-Way	QS-53	Three-Way	
1	QST-204	Four-Way	QS-54	Four-Way	
* 7	HESE NUMBER	S INDICATE BROWN.	ADD "I" FOR	IVORYLITE.	Est.

*Operating buttons can be supplied with luminous inserts. If desired, add "LT" to the catalog number.



Fits any standard interchangeable wall plate



Fits any standard toggle wall plate





THE ARROW-HART & HEGEMAN ELECTRIC CO. 103 Hawthorn Street, Hartford 6, Connecticut

Please send me product literature giving complete information on the Arrow-Hart INTERCHANGEABLE, Junior and Senior Quiette Tap Action Switches.

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Quality since 1890

WIRING DEVICES . MOTOR CONTROLS ENCLOSED SWITCHES . APPLIANCE SWITCHES

FCM

(95) SOUDERLESS TERMINALS. New catalog T-70 includes full-size illustrations of terminals, schematic drawings, specifications, and information on new bolt cutter and crimping tool. Vaco Products Co.

(96) ELECTRIC STUD HEATERS for accurate shrink-tightening of large studs and holding bolts used in assembly and servicing of motors and turbines are described in Bulletin L-1244. Edwin L. Wiegand Co.

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(97) CIRCUIT BREAKERS. Bulletin GEA-5915 provides detailed description on the operation and application of AK-2 low-voltage power circuit breakers for circuits up to 600 volts ac and 250 volts dc. General Electric Co.

(98) SERVICE DROP CABLE. 8-page bulletin RCP-361 describes neutralsupported secondary service drop cables, including scope of use, conductors, insulation, construction and tests. Rome Cable Corp.

(99) REPEAT CYCLE TIMER, which controls two independently adjusted load circuits for ON-OFF cycling in machine and process control applications, is described in new 4page bulletin N-80. Automatic Timing & Controls, Inc.

(100) STORAGE BATTERIES. 12-page reference and specification catalog GB-1848 provides information for selecting new calcium batteries for switchgear, alarm systems, telephone control, signalling or emergency lighting. Gould-National Batteries, Inc.

(101) MERCURY LUMINAIRE. Bulletin GEC-1490, 2 pages, provides information on new luminaire using 400-, 700- or 1000-watt lamps operated at 700 watts for improved lumen maintenance and longer lamp life. General Electric Co.

(102) WIRING TUBE. Bulletin T-2 describes spirally-cut, non-combustible polyethylene cable lacing which will secure any number of wires in cables from 1- to 4-in. in diameter. Panduit Corp.

(103) Motors. Bulletin SB-175, 4 pages, covers all general purpose fhp and integral hp motors from 1/20 through 200 hp plus new line of dc motors from 182 through 586 frame. Marathon Electric Mfg. Corp.

(104) SYSTEM MONITOR. Catalog sheet describes electric monitoring system which detects condition of voltage, frequency, and phase in any power source and is capable of operating contactors, switches, alarms or other devices. Electric Regulator ELECTRICAL CONTRACTORS!

Use this fast portable trencher for cable, pipe, tubing, conduit

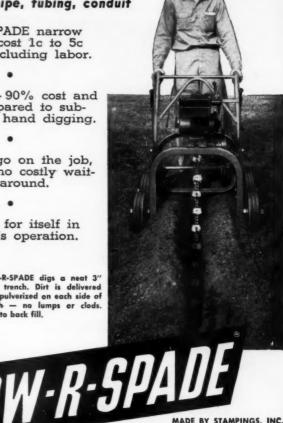
POW-R-SPADE narrow trenches cost 1c to 5c per foot including labor.

Saves 80% - 90% cost and time compared to subcontract or hand digging.

Ready to go on the job, at once - no costly waiting around.

Can pay for itself in one day's operation.

> POW-R-SPADE digs a neat 3" wide trench. Dirt is delivered well pulverized on each side of trench - no lumps or clods. Easy to back fill.



Portable from job to job. Easily handled by one man.



APPROVED and recommended by hundreds of users in every area of the United States.

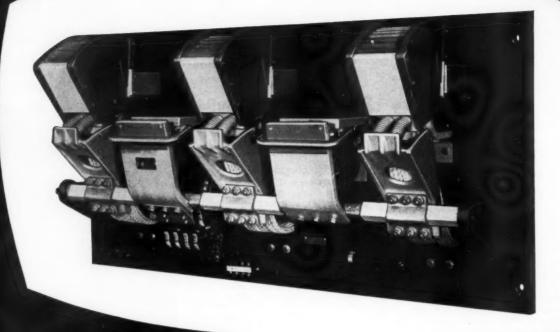
Get more facts about the earning power of POW-R-SPADE.

Davenport, la. WE ADMIT that these are strong statements. And yet, POW-R-SPADE users confirm them again and again. For here is a machine that is ideal for trenching 3" wide to 24" deep, where larger machines are costly and impractical; where hand labor is slow and expensive. No heavy wheel marks or unnecessarily wide trench to scar lawns. Digs right up to foundation of building. Goes 1½ to 17 feet per minute, depending upon soil conditions.

MADE BY STAMPINGS, INC.

A rugged machine. Easy to set and to operate. Oil-sealed bearings. Powered by a well-known engine. Minimum maintenance. Shipped completely assembled, ready to go to work for you. Additional interesting details and information immediately yours upon return of the coupon.

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Rugged* Simplicity

increases contactor life

Assures reliability of reduced voltage motor starters

ONE look reveals the clean, balanced design of Allis-Chalmers contactors. Fewer parts eliminate many potentially troublesome areas—mean less wear. Simple, solid construction and high interrupting capacity are positive assurance of reliability.

When you specify reduced voltage starters be sure to get the reliable, long life features provided by Allis-Chalmers contactors. It is these contactors that make all 600 volt Allis-Chalmers Size 4-8 reduced voltage starters the dependable performers they are.

Get all the facts. Call your nearby A-C sales office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

*7th meaning, Webster's New Collegiate Dictionary, Second Edition.





ALLIS-CHALMERS

Reader's Quiz

QUESTIONS from readers on problems of industrial equipment, installation, maintenance and repairs. Answered by electrical maintenance engineers and industrial electrical contractors out of their experience. For every question and every answer published we pay \$5.00.

Brakes for Conveyor System

QUESTION N34—Our plant has an extensive conveyor system powered with \(\frac{1}{2} \) and \(\frac{1}{2} \) hp, \(3\)-phase, 220-volt standard induction motors which are controlled by photoelectric eyes on a start-stop duty cycle. These motors are equipped with magnetic brakes and it would be desirable to control the motor acceleration and deceleration to give smooth starting and stopping. Can someone suggest a practical economical method for accomplishing this braking action?—R.E.B.

ANSWER TO N34—Attach the brake on a jack shaft, now use a flat belt from the motor to the jack shaft and another flat belt from the motor or jack shaft to the load. This will provide some slippage. If you need more slippage, then you can have the brake stop the motor and install a slipping clutch on the load shaft.—H.S.

ANSWER TO N34—A statement is made that the motors are equipped with magnetic brakes. This would indicate that these brakes are of the on-off variety. There are however, other types of brakes which have adjustable braking torque. These brakes are available from several suppliers, in particular the Warner Electric Brake & Clutch Co.

An alternative type of brake is the Selenibrake, a trade mark type of brake made by the American Rectifier Co, in New York City. What this Selenibrake does is to apply a heavy slug of dc through the stator winding and this stops the motor very quickly and smoothly. By adjusting the amount of dc through the motor you can control the deceleration as much as required to insure smooth stopping of the conveyor.

With regard to smooth starting and stopping, possibly a clutch brake which is a combined unit consisting of a clutch and a brake would be preferable. We have used this system extensively in the past on conveyor systems, and it has always proved a most satisfactory solution to the starting and stopping problem.—H.H.S.

Conduit in Concrete Driveway

QUESTION P34—Is it possible to pass sufficient current through a single No. 6 insulated conductor in a ½-in. conduit imbedded in a concrete driveway to be able to melt the ice and snow on the driveway? Can some one throw light on this subject matter?—J.A.M.

ANSWER TO P34—A No. 6 nichrome insulated wire spaced about 10 ins. between conduits would work although a No. 19 wire placed 4 ins. between rows about 1 in. below the surface will work and cost less. Start the system as soon as it starts to snow, and use enough circuits to melt the snow and yet not crack the concrete. The extra circuits will also help you take care of drifts

A sample installation is shown on page 104 of the June 1958 issue of Electrical Construction and Mainte-

For more speed or a colder district you can space the rows closer and for less speed you can move the rows to 6-in. centers.—H.S.

ANSWER TO P34-The amount of current you can pass through a single insulated wire in a conduit would depend upon the insulation. It would not be advisable to use a single straight run of conduit. It would get too hot. You would have to use special concrete near conduit. Also high temperature may damage rubber or ignite any gasoline or vapor on roadway. It is therefore advisable to zig-zag conduit across roadway or use several lengths, lengthwise. This will keep temperature at safe limit and speed removal of snow. Using special alloy wire, insulation and conduit will make the installation last longer.-E.B.

Conductors in Conduit

QUESTION Q34—Can the primary and secondary wires between a wound-rotor induction motor and its controller be installed in the same conduit?—G.J.P.

ANSWER Q34—The primary and secondary conductors of a wound-rotor motor can be installed in the

same conduit, and this can be substantiated by Sections 3011, 4322-d, and Table 9 of Chapter 10, of the National Electrical Code.

Section 3011 (last sentence) reads as follows:

Control, relay, and ammeter conductors used in connection with any motor or starter may occupy the same enclosure as the other motor circuit conductors. The words "motor circuit conductors" do not apply just to branch circuit conductors, but rather to all conductors which are necessary to energize the motor; e.g., primary and secondary conductors of wound-rotor induction motors, starting and running windings of single phase motors, and d-c motors with armature leads, etc. Therefore, all conductors to a motor are motor circuit conductors, if they supply current to the field or stator windings, armature, slip rings, or similar integral motor components. In addition to these conductors being permitted in the same enclosure, control, relay, and ammeter conductors may occupy the same enclosure.

Section 4322-d considers the secondary conductors of a wound-rotor, including controllers, resistors, etc., to be protected against overcurrent by the motor-running overcurrent device, and for other than continuous duty Section 4323 recognizes the branch-circuit overcurrent device as the proper protection if it does not exceed the maximum percentage shown in Table 27, Chapter 10.

Table 9, Chapter 10, in the note following the table states: "More than nine conductors are permitted in a single conduit for conductors between a motor and its controller". Here again the conductors refer to those mentioned in Section 3011, as previously stated.—J.H.W.

ANSWER TO Q34—The wiring of primary and secondary wires between a wound rotor induction motor and its controller is allowed by the National Electrical Code 1956 Edition in Article 300, section 3011. The section states that it is allowable to run conductors of different systems in the same conduit provided that the insulation of the conductors shall be for the maximum voltage of any conductor within the enclosure.—E.M.G.

Panelboard planning Altenhof & Bown

helps Power-Up State Office Building

The new Commonwealth of Pennsylvania Office Building in Pittsburgh exemplifies the type of planning that powers-up today for future needs.

More than 40 Westinghouse Panelboards (Type NLAB & Type CDP) provide for lighting and distribution system protection and service continuity completely adequate for today's demands, and readily capable of expansion or modification to meet tomorrow's ever-increasing electrical needs.

OWNER—General State Authority, Commonwealth of Pennsylvania ARCHITECT—Altenhof and Bown CONSULTING ENGINEER—Carl J. Long ELECTRICAL CONTRACTOR—E. C. Ernst, Inc. WESTINGHOUSE DISTRIBUTOR—Keps Electric Company

J-93542

Westinghouse CDP Panelboards installed in the new State Office Building to provide protection and control of power circuits. Shown on wall at left is one of the Type NLAB Panelboards which protect building lighting circuits.



YOU CAN BE SURE ... IF IT'S Westinghouse





here's a tip from GENUINE JOE on bearings!

For highest quality and perfect fit, use genuine Wagner Replacement Bearings ... exact duplicates of the originals. They're steel-backed, babbitt-lined and precision-bored. They won't seize or grab and they don't corrode.

Laboratory tests prove Wagner Bearings stand heavy pressure with a low temperature rise. No shaft scoring developed after 2½ years of continuous operation under a belt pull of many times full load.

Order a supply of Wagner bearings from your Wagner Parts Distributor today.



here's another tip from GENUINE JOE on



Easy does it with this special Wagner bearing tool that removes old bearing and perfectly aligns new Wagner bearing in one operation. There's no pounding ... no reaming ... no botched jobs.

It's wise to stock Wagner Replacement Motors..



Profit-wise Motor Repairmen keep a supply of Wagner Replacement Motors on hand. They're handy for emergency service. And they're mighty easy to sell as replacements for motors "too far gone" for repairs.

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MOTORS - BEARINGS - STANDARD ROTORS
BRUSHES - CAPACITORS - COMMUTATORS

OVER 950 AUTHORIZED SERVICE STATIONS OR PARTS DISTRIBUTORS

Testing DC Electrolytic Capacitors

QUESTION R34—I have been told that dc electrolytic capacitors must be connected with the marked polarity because they act as a short or very low resistance in the reversed direction. If this is the case, how can a true reading be obtained with a commercial tester that we have that uses ac to test all types of capacitors?—R.J.S.

ANSWER TO R34-You can't get the true capacity if your tester uses only ac on the capacitors. You can also damage the tester and condenser. In a motor circuit the impedance of the motor limits the current. You would have to use a ballistic galvanometer and dc or the Aerovox Company method. You could use a standard condenser (preferably the non-electrolytic type as the non-electrolytic are more durable and constant), dc and high resistance voltmeter and a stop watch. By charging and discharging through dc voltmeter and noting time of discharge with a stop watch determine the capacity. If you find the standard too large for portability, use an electrolytic as a secondary standard. Check the secondary standard against the primary standard once a day, week or month depending upon how often you use it and time periods between use.-E.B.

ANSWER TO R34-The simplest method of checking dc electrolytic capacitors is by use of a suitable ohmmeter. It will be found that when the ohmmeter is connected to the terminals of the dc electrolytic capacitor there will be a reading of low resistance and as the condenser charges, will change to a higher value. If the ohmmeter leads are reversed, the needle of the meter will kick to the end of the scale and will slowly return to a different value of resistance. It will be found that the highest resistance will be found when the ohmmeter is connected positive lead to positive terminal of condenser.

The use of commercial ac testers for dc electrolytic condensers is ill advised because of the condensers' constructional differences. Information of their differences can be found in the "Standard Handbook for Electrical Engineers" by A. E. Knowlton, published by McGraw-Hill Book Co., which also goes into considerable detail in describing more accurate capacitor-testing methods.—E.M.G.



"A drop in the bucket!" The constructions shown here by Tom Weichel, Okonite's portable cable engineer, are just a random sampling of the flexible cords and cables that Okonite has developed for industrial operations. More than likely, Okonite has available right now the exact cable you need—in terms of toughness, flexibility, capacity, resistance to oils, acids, alkalies, water, heat and abrasion. If not...we know how to build it!

Here's how we add value to your portable cable dollar

Behind these cable constructions are service records that prove the extra long life of Okocord flexible cords and portable cables under the most severe industrial conditions of mechanical abuse, run-overs, heat, oil, moisture, and constant dragging over cement floors.

Longer cable life means lower operating costs...reduction of costly work stoppages...greater utilization of expensive equipment. Truly, Okocord's longer life represents money in the pocket for any plant operator.

Here's how Okonite assures maximum value for your cable dollar.

- By the use of materials developed in 80 years of making the finest cables.
- By constant research to find even better materials and constructions.
- By intimate, first-hand knowledge of industrial problems and conditions.
- By self-imposed standards for manufacturing and testing that are more exacting than the industry requires.

There are Okocord quality cables for your machinery and portable equipment. There are Okonite specialists ready and willing to help you in the planning or installation stages. And there is a brand new booklet full of valuable hints on picking the right cable constructions for your all-important power or control circuits. Write for free Bulletin EC ·1117—"How to choose insulated cable"—to The Okonite Company, Passaic, New Jersey.



where there's electrical power...there's OKONITE CABLE



NAME	TYPE	RANGE	DESCRIPTION
JAGABI Speed Indicators	Chronometric	up to 100,000 rpm	Integrating-Measures average speeds
JAGAN Tochoscope	Chronometric	up to 20,000 rpm	A stepwatch and revolution counter in one— Time and motion integrated mechanically
JAGABI Five-Range Hand Tackometer	Centrifugal	up to 48,000 rpm	5 individual ranges—Direct-indicating—Show instantaneous speeds and speed variations
IAGABI Triple-Range Hand Tachometer	Contrifugal	up to 40,000 rpm	3 individual ranges—13-inch scale—Twice around dial—wide range in each range
JAGABI Single-Range Tachometer	Contrifugal	300 to 4,000 rpm	Exceptionally wide range—Double length 13-incl scale
JAGABI Single-Range Precision Hand Tachameter	Contrifugal	1,000 to 6,000 rpm	Dial diameter 120mm (4.7 in.) open, easy-to- rend scale
JAGABI Techograph	Contrifugal	up to 12,000 rpm	A recording techometer—Provides' permanent
DR. HORN Hand Tachemater	Contrifugal	up to 30,000 rpm	6 ranges — Simple, sturdy construction — Overspee protection
JONES Single-Range Hand Tachemeter	Centrifugal	up to 10,000 rpm	Open equi-spaced scale with stop button
JONES Double-Range Hand Tochometer	Centrifugal	up to 5,000 rpm	Open equi-spaced scale—with stop button
JONES Triple-Range Hand Tachometer	Centrifugal	up to 50,000 rpm	Open equi-spaced scale—with step button
JONES Stationary Tachemeters	Continuous indicating fixed type	up to 10,000 rpm	3", 4" and 6" diameter-diats—Uniform sca divisions—Heavy duty
Accessories for Jagobi, Dr. Harn, Jones			
METRON 3 in 1 Hand Tochomeler	Electric (Battery)	up to 100,000 rpm (with adapters)	3 single ranges—enty 1 visible at a time
FRAHM Hand Tachometers	Resonant Ress	900 to 100,000 rpm	Easy to use—Sefe—No contect with maving part—No weering parts—No ciling—No maintenance—Not injured by overspeeding—Imposes no lead on small motors or machines under tea
SWEENEY Tachometer Tester	Built on the synchronous)	Tests all but the resonant reed type tachometer —Accurate as an electric clock

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B-80

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Can You Answer These QUESTIONS

QUESTION Y34—The materials department of my company has received some new metal and wishes to determine the effect of expansion and contraction of same.

I have been given the job of designing means to automatically accomplish the following: The metal is to be suspended in several hundred degrees heat for three minutes and then lowered into a vat containing a cold solution for approximately one minute and then returned to the heat area for three minutes.

This operation is to continue automatically for 12 hours a day, a complete cycle to take place in approximately four minutes.

My first thought visualizes a motor, means to reverse direction of same, and means to stop the motor at a predetermined point at each end of the cycle.

The heat chamber is directly above the cold chamber and separated by a distance of approximately 4 ft. The metal could be lifted and lowered by a chain perpendicularly. Design of the heating and cooling chambers does not enter into this problem. Will be pleased to receive some suggestions.—B.A.S.

QUESTION 234—In our plant we use 6-8-volt pilot lamps on our 220-volt control circuits. Voltage to the lamps is stepped down by one of three means, viz., 1) a resistor in series with the lamp; 2) a capacitor in series with the lamp; 3) a 220/6-volt transformer.

I would appreciate getting opinions from some of your experienced readers as to the relative merits of each scheme.—R.E.B.

QUESTION A35—It would be greatly appreciated if you could provide me with a circuit which shows how you can get seven heats and an off position for an electric stove having two elements per plate and operating on a single phase, 3-wire, 120/240-volt circuit.

We do have a great number of these stoves in Canada, but it seems almost impossible to obtain information as to their operation.— J.S.B.

PLEASE SEND IN YOUR ANSWER BY OCTOBER 15



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Sylvania Mohawk Fixtures . . .

the modern approach to surface-mounted lighting

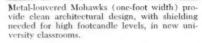
No matter how low the ceiling, you can always fit in 3¾"-deep Mohawk fixtures. For this attractive new Sylvania series is designed for quick and easy surface-mounting in today's typical low-ceiling rooms—with full illumination efficiency. And it saves you valuable installation time on the job... allows you maximum profit per job.

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2-, 4- or 8-foot lengths . . . and 5 different types of shielding. Using only a few catalog components, you can give them more than two dozen different lighting-design combinations.

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Dished contour plastic shielding on Mohawk provides attractive lighting design for corridors. Installation by Broadway Electric Service,

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Questions on the Code

Answered by:

B. A. McDONALD, New York Board of Fire Underwriters, Rochester, N. Y. B. Z. SEGALL, Consulting Electrical Engineer, New Orleans, La.

Neutral Feeder Load

Q. In Section 2203-G of the code, the following statement is made with respect to the neutral feeder load:

"For a feeder supplying household electric ranges, the maximum unbalanced load shall be considered as 70% of the load on the ungrounded conductors."

In Section 2121-C-1 covering range loads the following statement is made:

"The neutral conductor of a 3-wire branch circuit supplying a household electric range may be smaller than the ungrounded conductors but shall have a carrying capacity at least 70% of the current-carrying capacity of the ungrounded conductors."

Why should it be "load" in one Section and "carrying capacity" in the other Section? Was it believed that load was the better, because of difference it could make in calculating?—GJ.

The provisions of Section 2203-G comes under the general heading "Calculation of Load" on a feeder, and the specific clause quoted concerns the load to which a neutral conductor of a feeder. serving several ranges, is likely to subjected. Section 2121-C-1 comes under the general heading of "Branch Circuit Conductors", and the specific clause quoted concerns the size of the neutral conductor of a branch circuit serving an individual range. In the first case we are computing the load, and in the second case we are determining the size of the neutral conductor, when the maximum demand of a single range, rated 83 kw or more, is computed according to Column A of Table 29, Chapter 10.

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JRGY

In view of the foregoing, it appears that the terminology used is correct. Your observation with respect to the use of the word "load," because of the difference it could make in calculating, aroused my curiosity since I was unable to visualize the particular situation you had in mind. As a result, it was necessary to apply the provisions of Section 2121-C-1, as it now reads, and the following example brings to light a point of controversy.

A 12 kw, 115/230-volt range has a demand load of 8 kw. (See Table 29.) The current at 230 volts is 35 amps, and a No. 8 R or RH conductor is required to serve such a load. If we compute the neutral on the basis of the current-carrying capacity of a No. 8, Type RH conductor, we find that a No. 8 neutral is also required. 70% of 45 amps equals 31.5 amps. If we compute the neutral on the basis of the 35-amp demand load, a No. 10 conductor is all that is required. 70% of 35 amps is 24.5 amps.

If we compute the neutral on the basis of a No. 8 Type R conductor, we find that a No. 10 conductor is all that is required. 70% of 40 amps is 28 amps. As a result, we have a situation where a service entrance cable consisting of two-No. 8 Type RH insulated conductors and a bare No. 10 neutral could not be used to serve a 12 kw range, while the same assembly consisting of Type R insulated conductors could be so used. While I do not believe this was intended, the example emphasizes the fact when the neutral is determined on the basis of the variable current-carrying capacity of the circuit conductors, we will not obtain, in all instances, recognition of the 70% demand factor intended by the code. We are therefore directing the matter to the attention of the Chairman of Panel No. 2 of the N. E. Code Committee.-B.A. McD.-9/58/1

Control Conductors

Are there any installations where the number of control conductors that may be installed in a conduit in accordance with the code are in excess of those allowed by Section 7265?—R.R.M.

A Basically, Section 7265 does not place any limitation whatsoever on the number of remote control or signal circuit conductors that may be placed in a conduit. Table 4 is a quick reference to assist you in determining the size of conduit required where nine or less such conductors are to be installed. In many cases a larger number of such control and signal conductors

are involved in electrical installations. Table 9 is included, therefore, as a second quick reference to give you the conduit size where more than nine such conductors are involved.

There is, however, a practical and economical limitation. For example, while Table 9 shows you can install 176 No. 18 Type RHW conductors in a 3-in. conduit, you may find that because of the length of the run or for some other reason you may want to use two or more conduits instead of a single conduit run.

It should be pointed out that you may install even more conductors for use as remote control and signal circuits than shown in the table. For example, if you need 100 No. 10 Type RHW conductors you could place all of these in a single conduit. You would determine the minimum conduit size in accordance with the requirements of Table 11. Thus for No. 10 Type RHW, Table 13 shows the cross sectional area to be .046 sq ins. per conductor. For 100 conductors the total area of the conductors would be 100 times .046 or 4.6 sq ins. For a 40% fill the minimum cross sectional area of the conduit would have to be 4.6/.4 or 11.5 sq ins. Referring to the third column from the left in Table 12 we note that a 3-in. conduit has a cross sectional area of 9.9 sq ins. and a 3½-in. conduit, 12.72 sq ins. In this case we would have to use the 3½-in.

Here again the practical and economical aspects would have to be considered. While such an installation would be permitted, it may be found that the handling of 100 such conductors at one time would prove to be quite awkward.

It is also possible that different sizes of such conductors are involved. For example, 12 No. 12 and 15 No. 10 (all Type RHW) may be needed for an installation. The total cross sectional areas of the two sizes of conductors would be determined as above and the correct size of conduit would be obtained as shown in the previous calculations.

It should be noted that Section 7265 does not require derating factors to be applied to these conductors. In general, these remote control and signal conductors are normally unloaded and carry current for only very limited and ex-



How galvanizing by metallizing makes G-E WHITE Conduit corrosion resistant, easy to bend

General Electric uses metallizing to blast a uniform coating of pure zinc onto the exterior surface of G-E White rigid conduit. This superior galvanizing process produces a smooth, even coating that covers *every* square inch, including the threads. Two big advantages are the result:

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As a result, tests prove G-E White resists corrosion.

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2. Easier bending—with no zinc flaking. G-E White bends 19% easier, because zinc metallizing does not overheat conduit. This eliminates the need for quenching and straightening. The conduit is not work-hardened, but stays ductile. This makes installation easy and quick.

For further information on how you can give customers a more durable conduit installation, ask your distributor about G-E White. Or, send the coupon at right.





G-E White bends 19% easier because: Open hearth steel is used in the manufacture of all sizes of G-E White. The hard pickling and fabrication skin on most ordinary conduit is completely removed from G-E White. Metallizing eliminates quenching and straightening, which tend to harden ordinary conduit.

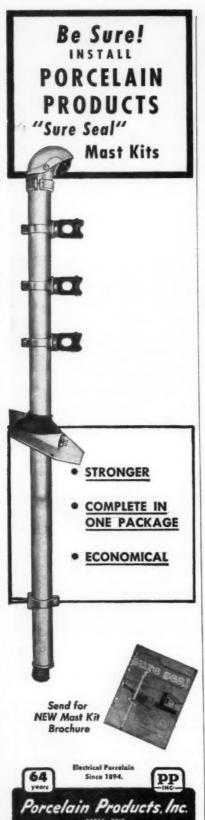


Protection down to the last thread. Every part of the exterior of G-E White—including the threads is covered by pure metallized zinc and organic lacquer.



Wire pulling is 14% easier than in ordinary conduit, according to impartial laboratory tests. An evenly-applied interior coating provides a low-friction, corrosion-resistant interior.

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tremely short periods of time.

As a final note this section does point out that wherever power and lighting conductors are installed in the same conduit (or any raceway for that matter) the derating factors will apply only to the power and lighting conductors. For example, suppose we extend a single conduit in a motor circuit containing say, three No. 12 for the motor main leads and three No. 12 for the remote control circuit to the motor's magnetic starter. We have six conductors in this conduit and on the basis of Note 4 of Table 1 we should derate these conductors by a factor of 80% of the full conductor rated current. In effect this may require the use of three No. 10 for the main motor leads. However, this derating does not apply since the three remote control conductors do not normally carry current and do not, as a practical result, add to the heating of the conductors within the race-

It should be noted that Note 4 in a fine print note has a cross reference to the exceptions contained in this Section 7265 as well as those in Section 3624 (Conductors in Wireways) and Section 3745 (Conductors in Auxiliary Gutters).—

B.Z.S.-9/58/2

Flexible Gords— Grounding Conductor

Q. Code Section No. 94003, par. b, reads as follows:

"Until January 1, 1958, this shall not be construed as prohibiting the use of a conductor having a green finish as an ungrounded circuit conductor, etc."

"Please advise the current code regulation concerning use of the green conductor in this respect.—

R.L.M.

A. For the benefit of our readers, Section 94003 requires a flexible cord, which contains a conductor intended to be used as a grounding conductor, to be identified by a green finish. Previous to the 1956 Code there was no limitation with respect to the duration of the fine print note which you have quoted in part above. The January 1, 1958 limitation first appeared in the 1956 Code and the occasion for the limitation was explained by Panel No. 6 as follows:

"This will coordinate with proposals by Panel 5 to reserve green for 'grounding conductor' identification only. The January 1, 1958 date will give the industry time to

adjust and work out their present stocks of materials which will conflict with this new requirement."

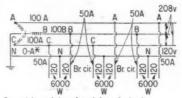
In view of the foregoing, it is my opinion, as of January 1, 1958 that no flexible cord shall contain a green finished conductor unless it is to be used for grounding purposes only. I know of no action taken by the Electrical Committee which negates this fine print note.

—B.A.McD.—9/58/3

3-Phase, 4-Wire Wye Computations

Q. We have a problem which has come under considerable discussion with the inspection agencies, and would like your opinion.

On the "Y" connected 208—3-phase service with 120 volts to the ground, in the computation from watts to amperes on a 3-wire 120-volt single phase lighting circuit, is the factor 240 or 208 for the determination of the ampere load per phase leg?—R.R.



Current in each leg of each branch circuit. 6000 W÷ I20V=50amps. or I2000÷240V= 50amps

Current in each phase of feeder=100amps.

When load is evenly balanced as shown the current in each phase of the feeder may be computed as follows;

Each phase subject to 12,000 watt load Total load on 3 phases 3x12,000 watts=36,000 Current in each phase feeder conductor= $\frac{36000}{208 \, x \, \text{I},73}$ =100amps.

 Current in neutral when fluorescent lamps are in use.

In order to clarify our answer to your code question, we have shown in the illustration a 3-phase, 4-wire, 120/208-volt, wye connected feeder, which serves three 3-wire branch circuits serving lighting loads operating at 120 volts. The loads connected to each branch circuit are equal in size and have the same power factor. Under such conditions the total load is evenly balanced over the three phases of the wye feeder.

As shown on the diagram the current in each phase conductor of each 3-wire circuit is computed on the basis of 6000 watts operating at 120 volts, or 12000 watts operating at 240 volts. In either case the branch-circuit current is 50 amps.

Yes, you can save cable dollars when you go to higher voltages!

For 15 kv and up—consider Anaconda Durasheath rubber-insulated, neoprene-jacketed power cable! Its lighter weight, flexibility of installation, ease of splicing may mean lower installed costs!

With today's trend toward higher and higher voltages, better look into the advantages of Durasheath*—Anaconda's superior-quality rubber-insulated power cable. It may mean big over-all cost savings!

New Anaconda insulating compounds, improved shielding, and advances in cable manufacturing technique have now made it practical to extend Durasheath's voltage range beyond 15 kv . . . to

25 kv . . . and to even higher voltages.

In lower and medium voltage ranges (600 volts to 15 kv), Durasheath has already earned an outstanding reputation for safety, dependability, long life—and money-saving versatility. For Durasheath can be installed overhead . . . in ducts . . . and underground, in continuous runs with minimum splices. Its flexibility and light weight are important, too, in cutting the costs of supporting structures.

Now, Anaconda's proven "know-how" in cable construction has made it possible to bring all these advantages to high-voltage Durasheath cable! If you're "going up" to higher voltages, see the Man from Anaconda about Durasheath. He will be glad to help you work out your particular problem. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. *Trademark*

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Available in all sizes, single and multiple conductor, copper or aluminum, 600 to 15,000 volts and higher.

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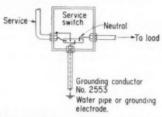


Since each phase conductor of the feeder serves 12,000 watts at 120 volts, the current in each feeder phase conductor will be 100 amps.

When the total load on the feeder is evenly balanced, computation on the basis of 208 volts as shown will result in the same answer. Reference to example No. 7, Chapter 10 of the Code verifies to some extent this opinion.—B.A.McD. 9/58/4

Scope of Service

Q. On the sketch below the neutral conductor only is shown. The main issue in this problem is the word "Service". Will the grounding conductor as shown be classed "Service"? Our opinion is that the service conductors and the service switch are all that should be classed under service.—G.E.K.



Would the grounding conductor be considered as being part of the service under section 2553?

If so, then you would not be permitted to install this conductor in a common raceway with other conductors as permitted by section 2598.

You would also be violating section 2306 if you installed this conductor in the same enclosure with branch circuits.

A. According to Article 100 of N. E. Code a service is defined as follows:

"Service: The conductors and equipment for delivering energy from the electricity supply system to the wiring system of the premises served."

A grounding conductor is defined as follows: "Grounding Conductor: a conductor used to connect an equipment, device or wiring system with a grounding electrode or electrodes."

In view of the above definitions it appears that your opinion with respect to the scope of a service is correct. While the common grounding conductor shown on your diagram is closely associated with the service equipment, it does not, in my opinion, come within the scope of a service.

Section 2553 of the code recognizes a common grounding conductor to be used for grounding the system, and also the service equipment and also other metallic enclosures and raceways which are



IAEI PRESIDENT Dewey L. Johnson, Atlanta, Ga., at recent NFPA Convention in Chicago, expresses disappointment over electrical correlating committee report shelving IAEI sponsored NEC revision outlawing interchangeability of circuit breakers. Short-sighted industry view on apparent need for such regulation will, he believes, lead to a rash of local non-uniform code changes which will create additional problems for manufacturers.

served through the service equipment. It is not in my opinion considered as part of the service, in view of the above service definition.

Section 2598 of the code permits a grounding conductor to be run in the same metal raceway with other conductors of the system to which it is connected. Official Interpretation No. 350, issued March 6, 1950 clarifies this rule as follows:

"Statement: A rigid conduit enclosing branch circuit conductors runs from the service equipment to a point near the grounding electrode.

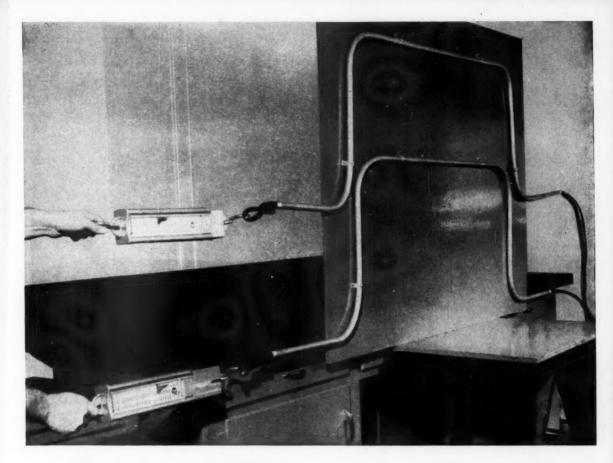
"QUESTION: Is it the intent of Section 3598 of the 1947 National Electrical Code to permit the service grounding conductor to run through rigid conduit and one or more outlet boxes, enclosing branch circuit conductors to a point near the system grounding electrode, when such a service is supplied by an overhead distribution system?

"ANSWER: Yes"

Section 2598 in the 1947 Code is the same as in the 1956 Code. It apears to me that this Official Interpretation supports your contention that a grounding conductor is not considered to come under the general heading of a Service.

Section 2306 prohibits conductors other than service conductors, grounding conductors, or control conductors from time switches having over-current protection, to be installed in a service raceway. Here again a distinction is made between a service conductor and a grounding conductor.

While I do not believe there are



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with Rome's new invisible lubricant!

Two almost identical groups of wire of the same size were pulled through identical lengths of ½" conduit. Yet, one group was 50% easier to pull! Why?

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In the illustration above, you can see that the force needed to pull nine wires (No. 14 AWG) through the bottom section of conduit was approximately 150 pounds. These wires were coated with the conventional paraffin-type lubricant.

Now, note the top half of the test. Same size wires. Same number of wires. Same %" conduit. But—these wires were coated with the new Rome Cable emulsion. Pulling force needed: Less than 75 pounds. Less than half the pulling force needed for paraffined wire. You can't see the coating—but, you can see the result, and it's permanently bonded to the insulation.

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Furthermore, extensive heating and aging tests have proved that this new emulsion coating will not be absorbed by the insulation, nor will it disappear through volatilization.

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This new extra-low-friction coating is now standard on many of the Rome wires and cables which have Rome Synthinol insulation. A list of wires and cables coated with the new emulsion is shown at the right. The next time you order building wire, be sure to ask your electrical distributor about Rome Cable's new emulsion-coated, easy-to-pull building wire.

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many occasions where a grounding conductor is run in the same metal raceways with other conductors, I do recall instances where it has been done for convenience without objection.—B.A.McD.—9/58/5

Interim Amendment No. 109

Tentative Interim Amendment No. 109 to the 1956 edition of the National Electric Code has just been released by the National Electrical Code Committee of the National Fire Prevention Association.

Effective July 18, 1958, the amendment recognizes use of Type MI Cable for general wiring in hazardous locations, and revises Code Sections 5014, 5015, 5054, 5064, and 5073 accordingly.

The following is the official text of Tentative Interim Amendment No. 109:

"To recognize Type MI Cable for general wiring in hazardous locations as indicated in the following revisions, but not to recognize the material for the support of pendent lighting fixtures."

Section 5014.a. Revise to read:

"a. Class I, Division 1 locations, threaded rigid metal conduit or Type MI cable with termination fittings approved for the location shall be the wiring method employed. All boxes, fittings, and joints shall be threaded for connection to conduit or cable terminations, and shall be explosion-proof. Threaded joints shall be made up with at least five threads fully engaged. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings. Where necessary to employ flexible connections, as at motor terminals, flexible fittings approved for Class I locations (explosion-proof) shall be used."

Section 5014.b. Revise first sentence to read:

"In Class I, Division 2 locations, threaded rigid metal conduit or Type MI cable with termination fittings approved for Class I locations shall be the wiring method employed."

Insert a new second sentence to

"Type MI cable shall be installed in a manner to avoid tensile stress at the termination fittings."

No change in the last two sentences.

Section 5015. Revise first paragraph to read:

"Seals are provided in conduit



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Under actual working conditions at a major oil refinery in Southern California, Rome's Synthinol 901 outperformed every other building wire tested. The other wires included regular TW, neoprene-covered, and braided rubber-insulated building wires. Lead-covered wire was also tried; and it was entirely satisfactory except for the excessive cost and handling problems.

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Rome's Synthinol 901 was used extensively for the low-voltage wiring in this refinery because of its proven resistance to moisture, oil, and corrosive vapors — environmental hazards common to refinery operations. These low-voltage applications — 600 volts and under—include not only control circuits but also the general wiring of office and warehouse buildings and refinery equipment.

Plant and oil refinery engineers have also found that Synthinol 901's superior heat deformation resistance makes it particularly applicable in locations where greater than normal heat conditions exist. In fact, it's now being used in place of Type TA asbestos-covered wire in panel boards and switchboards where high temperatures are known to occur. Rome's Synthinol 901 has proven to be an entirely satisfactory and economical solution to the exacting demands of this type applica-

tion. Try Rome's Synthinol 901—under your own operating conditions—and see for yourself how well it performs. You'll find it's ideal for low-voltage circuits in refineries, chemical plants, and similar installations where electrical wiring is exposed to corrosive atmospheres.

Specify Rome's Synthinol 901 for your next job. Contact your nearest Rome Cable representative for more information—or write to Dept. 321, Rome Cable Corporation, Rome, N. Y.

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systems to prevent the passage of gases, vapors or flames from one portion of the electrical installation to another through the conduit. Such communication through Type MI cable is inherently prevented by construction of the cable, but sealing compound is used in cable termination fittings to exclude moisture and other fluids from the cable insulation, and shall be of a type approved for the conditions of use. Seals in conduit systems shall conform to the following:

Section 5054.a. Revise first paragraph to read:

"In Class II, Division 1 locations, threaded rigid metal conduit or Type MI cable with termination fittings approved for the location shall be the wiring method employed. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings."

Section 5054.a.1. Change first sentence to read:

"Fittings and boxes shall be provided with threaded bosses for connection to conduit or cable terminations, shall have. . . ."

Section 5054.b. Revise first paragraph to read:

"In Class II, Division 2 locations, rigid metal conduit, electrical metallic tubing or Type MI cable with approved termination fittings shall be the wiring method employed."

Section 5064.a.1. Revise this paragraph to read:

"Where accidental damage or breakdown of insulation might cause arcs, sparks or high temperatures, rigid metal conduit, electrical metallic tubing, or Type MI cable with approved termination fittings shall be the wiring method employed. For conduit or electrical metallic tubing, the number of conductors shall be limited only by the requirement that the cross-sectional area of all conductors shall not exceed 40 per cent of the area of the raceway. Where limited flexibility. . . .

Section 5073.a. After "conduit" in the second line, insert: "or Type MI cable".

Developed under the published Procedure for Tentative Interim Amendments, the revisions and changes in indicated Code Sections are recommended by the Committee for application in the administration of the 1956 edition of the NEC. These amendments are also included in the proposal submitted by NEC Code-Making Panel No. 14 in connection with preparation of the proposed 1959 edition of the National Electrical Code.—9/58/6

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E CONNECTORS

Best testimony to any line of products is who uses them and why. For over 30 years contractors all over the USA have used more IDEAL Wire Connectors than any other kind - millions more every year. And now they're using more than ever! Why? Most likely because they've proved to themselves that IDEAL Connectors do a better job — are easier to use — and assure wire joints that unfailingly meet every standard for safety, permanence and quality wiring. This elminates high-cost call-backs due to faulty connections.

Use IDEAL Wire Connectors - most contractors do!

PRE-FABRICATED INSULATION FOR EASIER, BETTER

CRIMP CONNECTORS with the

"Wrap-Cap" gives you a joint better insulated than the wire itself . . . all around and between the wires and double-wrapped over ends.

STRONG . . .

Cadmium-plated, double-crimped steel sleeve permanently locks wires into a cool, vibration proof, pull-proof joint with very low electrical resistance.

SIMPLE . . .

No special tool needed.

1. Crimp sleeve with IDEAL Electricians Pliers.

2. Apply "Wrap-Cap" and pull tabbed cap between wires and over joint, Job's done!



The 7-ways better screw-on connector with the WIRE-CRUSHING GRIP. Up to 2½ tons of pressure-force from screw-and-lever and wedge action flattens wires and multi-plies contact. Just screw them on — like a nut on a bolt! Use new "Wire-Nut" wrench if you like.







Set 'em and see 'em! A screw driver's all you need. Permits visual inspection of every joint. A breeze to re-use when making circuit changes. Solid brass sleeve and setscrew—long-skirt, highest dielectric shell.

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All IDEAL Wire Connectors in all contractor sizes are UL listed as pressure cable connectors, for general use (600 V.) in branch circuit and fixture wiring.

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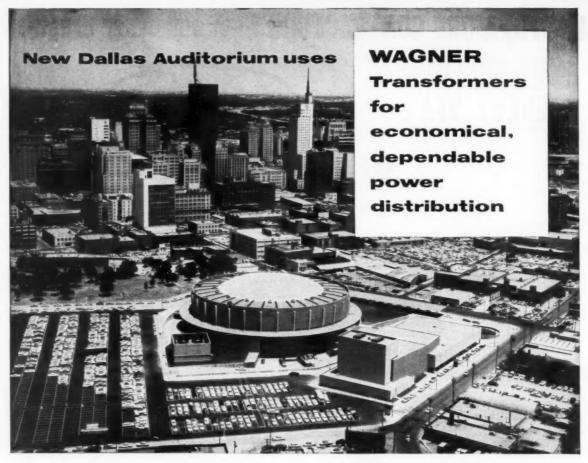
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The mammoth, saucer shaped Dallas Memorial Auditorium, with its 300 foot diameter circular stadium, is a tremendous consumer of electric power. Its total connected load for power and lighting is 3250 kva. That's enough electricity to supply the power needs of 1200 modern homes!

This electric power is distributed efficiently and economically by 21 Wagner Dry Type Transformers. These transformers put the correct voltage right where it is needed—close to the load. Such installations are extremely economical because they eliminate long runs of wiring and reduce line losses in the distribution system. They meet all safety requirements for indoor installation.

Wagner Dry-Type Transformers can answer your power distribution needs just as they do at the Dallas Auditorium. Call your nearby Wagner Sales Engineer and have him tell you how these transformers can modernize your power distribution system. Bulletin TU-57 gives full information if you prefer to write.



A 300 kva Wagner Dry-Type Transformer in the Dallas Auditorium...one of 21 of these units, ranging from 25 through 300 kva, that provide a total capacity of some 2400 kva.

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WT58-7

ELECTRIC MOTORS . TRANSFORMERS . INDUSTRIAL BRAKES . AUTOMOTIVE BRAKE SYSTEMS - AIR AND HYDRAULIC

Motor Shops

Hooded Burnout and Stator Stripping Unit

Substantial reduction in stator stripping time has been effected in the motor repair division of Sullivan Electric Co., Cincinnati, Ohio, by combining coil burnout and removal in a single piece of compact shop equipment. An original idea of Tampa Armature Works' Arthur Turner was adapted by Sullivan's Seldon F. High to his own shop layout. The net result was the combined operation under a single hood.

Stators rest on a three-pronged "spider" which rotates about 36 in. above floor level on a 6-in. diameter pipe pedestal. Two 5-in. channel beams bridge the booth frame about 24 in. above the floor and support the welded pedestal which extends about 8 in. above and 7 in. below the top of the back-to-back channels.

Each spider arm consists of two 16-in. lengths of 4-in. channel welded back-to-back with ½ in. spacers between. The resultant slot accommodates stator clamps which are added for the coil-pulling operation. The arms are welded, at 120-degree angles, to the periphery of a pipe sleeve which telescopes in the pedestal.

A gas pipe extends up through the pedestal with a threaded end near the surface of the spider. Perforated can-type burners, of various diameters and lengths, are



BURN-OUT BEGINS with stator centered over can-burner matched to frame size. Stator rests on triple-arm spider rotating on pipe pedestal supported by channel-iron frame.

coupled to the gas pipe for different size stators. Those commonly used in the Sullivan shop are: 1½ in. dia, by 5 in. long; 2 in. by 6 in. and 5 in. by 9 in. for the larger motors. The burners provide a cylindrical pattern of needle flames for even distribution around the stator interior; eliminate possibility of flame concentration and resultant hot spots.

Before a stator is burned out, one side of the winding is cut close to the laminated core with an electric or air chisel. The stator is then centered, cut side down, on the spider. After the proper size burner is attached to the pipe, the gas is ignited and burn-out begins. When the insulation is sufficiently softened, charred, or burned off, coils can be easily removed. Typical burn-out time for a 3-hp stator is approximately 15 minutes.

Coil removal can begin immediately after the gas flame is extinguished. Since the stator remains on the spider, no time is lost in moving it or waiting for it to cool off. At this point, stator clamps are added to hold the motor in position while the coils are pulled out. The mechanic wears asbestos gloves.

Sets of clamps (three in each set) are made from 1 in. by 21 in. steel stock shaped like the numeral "7". Length of clamp and width and depth of its gripping claw varies for different frame sizes. Five rectangular (3 in. by 2½ in.) slots are cut vertically in the shank of each clamp in a staggered, slightly overlapping pattern. These seat a tapered steel wedge which is inserted under the spider arm after the clamp has been applied to the frame and dropped in the spider slot. By tapping each of the three clamp wedges lightly with a hammer, pressure is applied to the underside of the spider arm and the resultant downward pull of the clamp securely anchors the stator. Use of the wedge-clamp cuts set-up time considerably over that required for the J-bolt, standard or wing-nut type.

Coils are pulled out of the stator slots by a ½-ton electric hoist installed above the spider and equipped with scissors-type gripping tongs. Up and down hoist operation is controlled by a reversing foot switch. With one free hand, the mechanic guides and manipulates the hoist tongs; with the other



coils are removed from clamped stator by electric hoist with coil tongs immediately following burn-out. Footswitch control frees both hands to manipulate tongs, discard coils and rotate spider. Hood vent removes fumes.



LAST TWO coils leave slots while stator is still warm, about five minutes after start on 3-hp unit. Note quick-set wedge-type stator clamps on rotating spider.

he rotates the stator and discards the extracted coils. With this technique, coils can be removed from the burned out 3-hp stator (mentioned above) in approximately five minutes. Total time for stator burnout and stripping—about 20 minutes.

A hood vent system for the threesided enclosure removes combustion fumes and prevents heat concentration within the area.

Mezzanine Storage For Motor Parts

A substantial inventory of replacement parts is a prerequisite of good customer service. Having parts immediately available from

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PRODUCTS DIVISION

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MEZZANINE divides shop section beyond bridge crane serving bake oven and test panel (right), burn-out oven (left, not shown), and loading area.



PARTS STORAGE area on mezzanine has parallel rows of metal shelves to accommodate a substantial inventory of replacement parts. Note space for expansion.

stock generally means quicker delivery of a repaired motor and better customer relations. Repair firms designated as "authorized service shops" for specific brands of motors acknowledge this and provide adequate storage facilities for such replacement items. The more brands involved, the greater the number of spare parts required. Past service experience generally determines the quantity of each part which must be kept on hand. Shops servicing several brands of motors frequently face a somewhat perplexing parts storage problem.

McBroom Electric Co., Inc., Indianapolis, an authorized shop for a number of manufacturers, took this into consideration when they built a much needed addition to their motor repair shop. They simply added a mezzanine floor to one section of the new building. The high-bay area adjacent to the existing structure has a bridge crane traveling its full length for indoor loading and unloading of trucks, and to serve burnout and bake ovens, dip tanks and a test panel.



L. C. Marschall, Executive Vice President, discusses the general management viewpoint on "conservative design"

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It's usually quite difficult to find a comfortable position seated out on a limb. We, at Sola, avoid this unenviable position by making sure our mercury lamp transformers perform as we claim they will, plus an adequate margin of safety.

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to keep our claims conservative and straightforward. This is in keeping with our policy of conservative design which is prevalent throughout Sola's entire line of products.

For example, we state that our ballast for one 400-watt mercury lamp has an efficiency of 89.2 percent. This is conservative. If anyone claims higher efficiency than this, we prefer it be you — after you've had experience with the operation of this constant wattage mercury lamp transformer.

Write for your copy of Bulletin 171-MV-306

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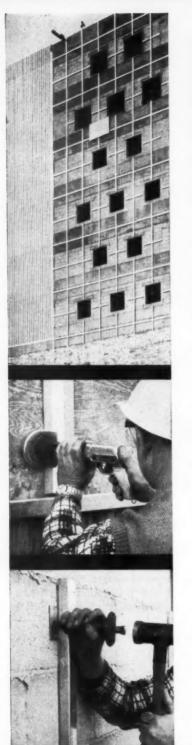
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PLYWOOD END panels on shelf tiers have parts "directory" for quick identification. This aisle has some 240 parts drawers as well as bins and shelves.

The rest of the first floor area under the mezzanine provides space for work benches, large equipment storage and wash rooms.

Small motor parts storage is concentrated on the mezzanine floor. Here, rows of back-to-back, floor to roof shelves provide adequate facilities for storing the hundreds of replacement parts for a number of different motors, electric hoists, etc. Storage directories list such items as brushes, condensers, bearings, end bells and other parts.

Each tier of metal shelves is approximately 13½ ft long, 2 ft wide and 6½ ft high. Spacing between shelves is tailored to fit the equipment stored. Some shelves accommodate banks of drawers for small items; others, bins or cartons or individual parts items. Three-foot aisles between tiers provide easy access and fluorescent aisle lighting provides illumination adequate to see the smallest identifying labels.

Natural-finish plywood panels mounted to the outer end of each tier of shelves contribute to the neat appearance of the stock area. Parts identification, by manufacturer and functional category, is stenciled on the face of these panels in large, easy-to-read lettering. There is no need to duck in several aisles to find a specific part.

At present, about half of the mezzanine area is being used. There is plenty of space for expansion when conditions warrant.

Squirrel Cage For Testing

In the motor repair shop of H. Josephs, Gardenville, Pa., a test rotor is used to check direction of rotation on fractional horsepower motors. This shop does a large



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Bottom "Wedgit" channels inserted.



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Side "Wedgit" driven easily into final position.

CUT INSTALLED COSTS OF CABLEWAYS with this improved UNI-TRAY system

With DELTA-STAR's improved UNI-TRAY cableway systems you reduce installation time as much as 40%. Simply position the trays, then tap in "Wedgit" fittings to connect sections. No bolts, pins, or hinges to fit or tighten. UNI-TRAY joints are assembled four times faster than cableways with other types of fittings.

Strong, lightweight expanded metal sections provide the ventilation necessary for high current rating of cables, prevent collection of water and dirt. And continuous contact area of the "Wedgit" fittings provides an excellent contact for grounding.

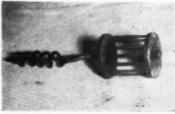
Hot-dip galvanized steel or aluminum sections, with aluminum "Wedgit" fittings. A wide variety of shapes and sizes to meet your requirements.

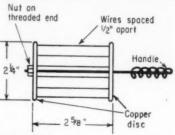


USEFUL UNI-TRAY CATA-LOG • Ask your Delta-Star representative for this tellall brochure, or write Dept. 506, Delta-Star Electric Division, H. K. Porter Company, Inc., 2437 Fulton Street, Chicago 12, Illinois. District offices in principal cities.

H. K. PORTER COMPANY, INC.

DELTA-STAR ELECTRIC DIVISION





TEST ROTOR is a small shop-made squirrel cage mounted on the end of a rod handle which runs through holes in the two disc ends.

volume of rewind work on fractional-hp appliance motors. The test rotor provides testing before final assembly.

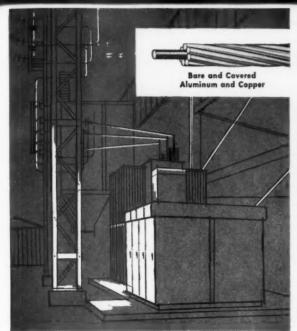
In a normal procedure, the test squirrel cage is inserted in the motor stator and momentary connection of the motor windings is made to the current supply. Usually, the test rotor will revolve, indicating the direction of rotation for that hookup. The test rotor also serves to check the condition of the winding. If the stator winding is shorted or open, the rotor will not revolve at all. And the rotor can also be used to save dismantling of some motors to establish proper direction of rotation.

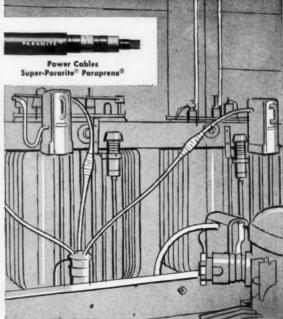
The test squirrel cage is made of No. 9 wire soldered at both ends to copper discs. The handle is a piece of twisted steel wire with a nut on its threaded end to hold the cage on the shaft extension of the handle.

Pedestal De-reeler For Motor-Lead Wire

Motor-lead wire, in sizes No. 14 through No. 2, is purchased in fairly large coils at Willey-Wray Electric Company, Cincinnati. Then it is rewound on a number of old reels for use throughout the motor repair shop. When needed, short lengths are cut from these reels to meet the requirements of specific motor rewind jobs.

Unless adequately supported, these coils of flexible cable can become rather unwieldy during re-





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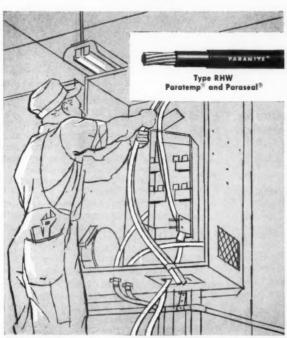
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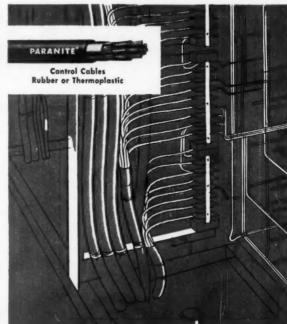
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PARANITE WIRE AND CABLE DIVISION

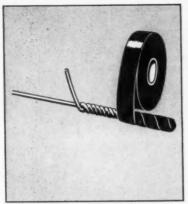
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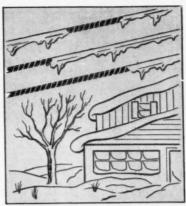




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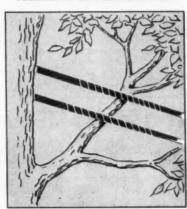
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H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION



DE-REELER at the Willey-Wray shop has simple coil frame with friction-brake hub rotating on a sturdy pedestal base.



BRAKE on hub controls de-reeling coil tension. Adjustable compression spring at base applies lever-arm pressure to leather-lined brake shoe. Note "finger-extensions" on frame to support cable.

reeling. To simplify this operation, Willey-Wray mechanics designed and built a pedestal de-reeler incorporating a revolving tapered coil support controlled by a spring-actuated friction brake. Now, one man can easily transfer lead-wire from its original coil to several reels in a relatively short time.

The unit's quadruped base came from a heavy-duty fan pedestal. It has a 28-in. span for rigidity and a 1\(\frac{1}{4}\)-in. pipe standard, 15 in. high, with a ball-bearing base to support the coil frame.

Hub of the coil frame is a 4-in. collar of $3\frac{1}{4}$ in. (O.D.) steel tube ($\frac{1}{4}$ in. thick) which rotates on the ball-bearing base. Four diametrically opposite slots in the top of the collar seat two 13-in. cross pieces of $\frac{2}{3}$ -in, cold rolled steel. These,



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Shown above are the components of a Revere outdoor lighting installation. Every component — pole, base, bracket, lights — is *perfectly matched* to every other component, so the completed installation is exactly right for the job. Components "fit" right to make installation easy, they are structurally matched for strength and balance, and "design-matched" to give peak lighting efficiency for the application.

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COIL of motor lead-wire is placed on

de-reeler ready for rewinding on reels for shop use. De-reeler permits one man to do complete operation.



RETAINER STRIP of flexible steel holds coil in place; keeps wire from creeping up frame pay-out. Set-screw collar locks strip in place.

with a 4-in, finger-extension (1 in. rod) at each end, form the base of the frame. Four ½ in. rods (17 in. long) welded to the cross pieces taper upward to a 53-in, diameter steel plate to form the basic frame.

A fe in. steel rod extends up from the hub center to a point a few inches below the top plate. This supports a flexible retainer strip made of 0.020 spring steel, 13 ins. wide and 21 ins. long. Vertical adjustment is provided by a set-screw collar.

Pay-out tension is controlled by a friction brake on the frame hub. A leather-lined, 2-in. square, steel shoe rides the lower surface of the hub collar. It is pin-connected to the top of a 12-in. arm (½ in. key stock) pivoting in a pedestal bracket about 3 in. below the shoe. Brake pressure is applied by a compression coil spring supported by a threaded horizontal bolt.



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ELECTRICAL CONSTRUCTION AND MAINTENANCE . . . SEPTEMBER, 1958



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George J. Taylor of New York, vice president of DayBrite Lighting, Inc., has been elected president of the Illuminating Engineering Society for a one-year term, which begins October 1, 1958, in a mail ballot of the 9000-member organization composed of U.S. and Canadian lighting engineers, designers and related lighting specialists. He succeeds Kirk M. Reid, senior illuminating engineer of the General Electric Company, Nela Park, Cleveland, Ohio, who has served as president of this group since last October 1st.

Also elected to national offices of the society were: Richard G. Slauer, sales manager of the fixture division, Sylvania Electric Products Inc., Wheeling, W. Va., for a two-year term as vice president; James R. Chambers, sales manager of the lighting products division, Appleton Electric Co., Chicago, general secretary; and G. Franklin Dean, superintendent of the lighting services department, Toronto (Ont.) Hydroelectric System, Toronto, Canada, treasurer.

Joe B. Browder, assistant vice president in charge of sales, and sales manager, Georgia Power Co., Atlanta, continues as IES vice president for the second year of his two-year term.

Mr. Taylor served the society as vice president and Mr. Slauer as general secretary during the last two terms. Mr. Chambers was treasurer during the 1957-58 period.

Two new directors and six regional vice presidents also were elected in the balloting of the membership, which is divided into 82 sections and chapters. The new directors, who will serve three-year terms, are Ray P. Teele, physicist in charge of research on photometry, National Bureau of Standards, Washington, D. C., and Joe Thomas, commercial and industrial sales promotion in the lamp department of the Canadian General Electric Co., Ltd., Montreal.

New regional vice presidents. each to serve a two-year term, are: James E. Barnes, North Bay division lighting engineer, Pacific Gas and Electric Co., San Francisco, South Pacific Coast region: Robert W. Brown, director of market research, Cincinnati (O.) Gas and Electric Co., Great Lakes region; Brooks Chassaing, partner in Chassaing Bros., Lighting, St. Louis, Mo., Midwestern region; J. M. Gensburger, industrial representative, New Orleans (La.) Public Service, Inc., South Central region; Raymond L. Smart, supervisor of the commercial lighting division, Boston (Mass.) Edison Co., Northeastern region; and Beverly A. Travis, consulting electrical engineer, Seattle, Wash., Pacific Northwest region.

Mr. Taylor, the newly elected

president, who is in charge of Eastern operations for DayBrite Lighting, previously was with the General Electric Co. in Cleveland and New York. He was also a consulting engineer in New York. Before becoming vice president in 1956, he served the society successively as treasurer, general secretary, and regional vice president, Northeastern region. His current society activities include the chairmanhip of the President's Advisory Board and membership on the Executive Council Committee.

Mr. Taylor has been active on many of the society's technical committees, particularly in the fields of office and industrial lighting, areas in which he is a leading authority. He has written many technical papers, and his work has been published in electrical and industrial trade magazines as well as in technical journals. He has been a fellow of the IES since 1953.

He has also been chairman of the society's New York section and chairman of the national Regional Activities Committee.

A native of Chicago, he is a graduate of the Armour Institute of Technology with a degree in Electrical Engineering. He also holds a master of science degree from the Massachusetts Institute of Technology.



IOWA AWARD WINNERS in the 1957 International Lighting Contest are Lee Widigen (extreme left) Lighting Representative of the lowa-Illinois Gas and Electric Co., who won two Honorable Mentions for store lighting jobs. J. Z. Aponyok (middle left) representing the M. L. Parker Co., and Ray Phillips (extreme right) of the Phillips Plumbing and Heating Co. both received Certificates of Conformance awarded by the National Lighting Bureau to owner's of prize winning entires. Presentations were made by William Martens (middle right) assistant editor, EC&M, who represented the sponsors of the contest, at the summer session of the Iowa Section of the Illuminating Engineering Society.

RECOMMENDED FOR SERVICE IN:

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Bulk Plants

Textile Plants

Chemical Plants

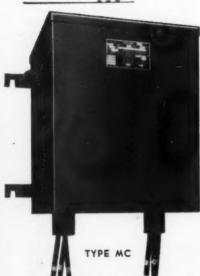
Granaries

Dust-tight
Weatherproof
Corrosion Resistant

LOW VOLTAGE TRANSFORMERS FOR HAZARDOUS LOCATIONS









Standard Type MC low voltage transformers are designed for use wherever explosion-proof equipment is required. Standard is now specified by most major oil companies and these units are used in hazardous or dust-laden locations. Windings are not exposed to lint, dust and dirt. These air-cooled, drytype, compound filled transformers are efficient, compact units designed for indoor or outdoor service. Special all-welded steel cases are available. Type MC is designed in sizes through 15 KVA only and ratings through 600 V—single or three phase.

Type ME is designed with Class H insulation in sizes through 150 KVA and ratings through 4800 V—single or three phase. These are completely sealed units but are not compound filled.

Both types are available with terminal chambers or conduit nipples with leads brought out as illustrated.

Standard ransformer co.

WARREN, OHIO

"WHEREVER THERE IS POWER'



CONTRACTORS John C. Staff, Jr., (left) Staff Electric Co., Milwaukee and John A. Schneider, Langsadt's, Inc., Appleton, Wis., receive plaques for four winning entries in the 1957 International Lighting Competition. Making presentation at Milwaukee Electric League Award Luncheon is August Eckel, Electrical Construction & Maintenance, representing competition sponsors.

He has been active for many years in the American Institute of Electrical Engineers in which he is a past chairman of the New York section's illumination division. He is also a member of the Illuminating Engineering Society, London, England, and the National Society of Professional Engineers.

He holds professional engineer licenses in New Jersey as well as

New York.

NEMA, IAEI Settle Breaker Problem

Possibility of a 1959 National Electrical Code rule limiting the interchangeability of 250-volt circuit breakers in panel assemblies was definitely improved as a result of a recent NEMA-IAEI conference in Chicago. At the all-day session, representatives of the circuit breaker section, NEMA, and the five sections of the International Association of Electrical Inspectors agreed upon specific current ranges within which breaker interchangeability will be permitted.

After considering all problems involved, the following practical breaker classifications were approved:

0-20 amps

21 - 50 amps 51 - 100 amps

General intent of the agreement is that breakers may be interchanged within each current classification but not between classifications. Manufacturers are expected to develop a suitable design to prevent replacement of units in the lower current range with breakers in the higher current range.

TALESCOPE ...telescoping aluminum work platform for overhead construction and spot maintenance

Lightweight, rapidly assembled by one man. Extends instantly for reaching heights up to 30 ft. Telescopes for rolling under trusses and other obstacles. Adjustable legs for uneven floors or stairways.

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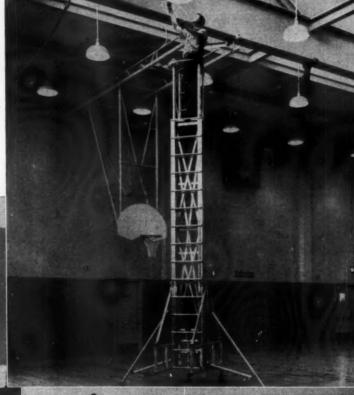
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Bridges over auditorium seats.

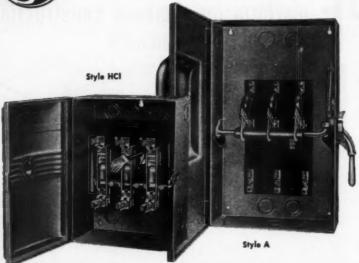
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give you <u>extra service</u> <u>-extra safety</u>

Extra margin of safety

General Electric HCI heavy duty safety switches have operated successfully 50,000 times—an extra safety margin of 400% over standard U/L requirements.

Extra "ON"-"OFF" Indication

New easy-to-see yellow "SAFETY FLAGS" mounted on HCI pole units give positive indication of blade contact position—from over 50 feet away! No guessing whether switch is on or off. You know... immediately!

Extra years of service

Many users report General Electric Type A heavy duty switches still working perfectly after over 30 years of service.

Extra wide selection

General Electric normal and heavy duty switches are rated from 30 to 1200 amperes, up to 600 volts; single- and double-throw operation; 2, 3 or 4 pole design; fusible or no fuse. All general and special purpose enclosures. For extra service and safety—standardize on G-E safety switches.

General Electric Company, Circuit Protective Devices
Department, Plainville, Conn.





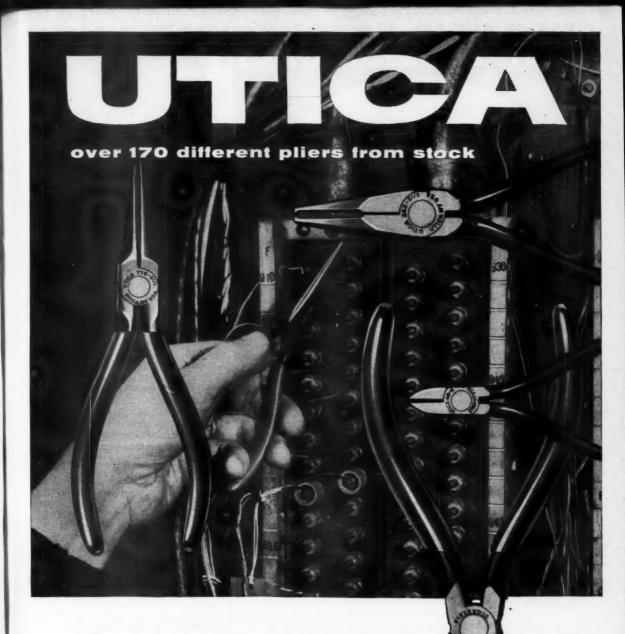
CHIEF ELECTRICAL INSPECTOR for the borough of Brooklyn, N. Y., William A. Moore, is in his 36th year with New York City's Dept. of Water Supply, Gas and Electricity. A member of that department's Advisory Board and chairman of New York's Code Interpretation and Revision Committee, he has been working on New York's new Bulletin 11 on safety regulations for high-capacity secondary services.

The new proposal now reverts to the Code Making Committee of the Section Correlating Committee, to be submitted to the Electrical Section Correlating Committee, NFPA, for inclusion in the 1959 edition of the National Electrical Code.

This latest action is the culmination of an extended effort on the part of electrical inspectors to curb an apparent nation-wide abuse of the flexibility features of the interchangeable circuit breaker design. Field experience indicated a serious safety problem was created by do-it-yourself replacement of system design sized breakers with units of higher current capacity without due consideration of branch circuit conductor size. Various IAEI sections requested that some means be devised to limit breaker interchangeability within specific current ranges (similar to the present fuse-holder categories). An IAEI code change to this effect was rejected by the NFPA Electrical Correlating Committee in May and referred back to the IAEI for revision to present a better solution to the problem.

Manufacturers, faced with a possible rash of non-uniform local ordinances limiting breaker interchangeability, were understandably reluctant to make costly design and production changes until a standard classification pattern was established. That pattern was set at the recent NEMA-IAEI conference and indications are that both groups will support a 1959 NEC change to

Chicago already has an ordinance



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the right tool means a better job

That's why Utica offers such a broad range of standard toolshundreds of pliers, wrenches and other hand tools direct from stock. And to keep pace, Utica is continually developing special and custom tools for the changing needs of industry. If your operation should suddenly call for a special plier or wrench, confer with your Utica Distributor. Counseling on the use and development of new and special tools is a regular part of his business.

Utica Drop Forge & Tool Division, Kelsey-Hayes Co., Utica 4, N.Y.

USE UTICA... the tools the experts use!

Hallmark of Quality since 1895 (UTICA DROP FORGE & TOOL DIVISION . KELSEY-HAYES CO., UTICA 4, NEW YORK

For more dependable, accurate circuit control



Don't be satisfied with just any time switch. Specify the proven dependability and accuracy of Sangamo Heavy-Duty Time Switches for greater convenience, economy and accuracy in circuit control. Sangamo Time Switches require little or no attention and provide unfailing on-off

In addition, Sangamo Heavy-Duty Time Switches equipped with an astronomic dial automatically compensate for daily changes in operating time-all year 'round Sangamo's automatic carryover feature keeps switches running for up to 10 hours should power fail-no resetting is required. The carryover rewinds itself electrically after an outage.

Have your Electrical Wholesaler show you the high quality line of Sangamo Time Switches.

Sangamo Heavy-Duty Time Switches are quickly and easily installed. There's plenty of inside wiring space and multiple knockouts in sides, back and bottom.

Sangamo Heavy-Duty Time Switches stand up to rough handling...are rugged...give unfailing on-off control...and are "no-call-back"



SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

Now is the TIME to SWITCH to SANGAMO



LIGHTING AWARD was won by A. E. Shulzinsky (right), of Olson Electric & Hardware Co., Daytona Beach, Fla., for his floodlighting installation at Heintzelman Motors used car lot, same city, which placed third in the Outdoor Lighting classification of the Electrical Contractor division. Certificate was presented by Berlon C. Cooper, chairman of the 1957 International Lighting Competition, in which the award was won.

limiting use of changeable breakers (EC&M, July 1958, page 171). While the 1958 Chicago Electrical Code became effective Sept. 1, 1958. enforcement of the interchangeable breaker regulation has been postponed until December 1 with relief clauses for contracts signed prior to that date.

Electrical contractors, particularly those in the residential field. will be following resolution of this problem with considerable interest. Their inventory of load center items will be affected. The NEMA-IAEI agreement on breaker classification should clarify the situation. But, until this does or does not become part of the National Electrical Code, an unhealthy degree of uncertainty will exist.

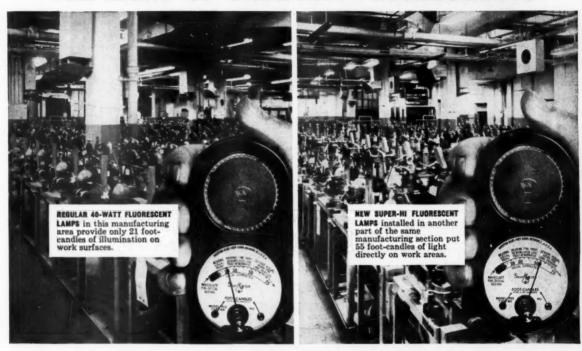
Electric Heating in Home Development

Electric space heating has found successful, economical application in the 67 houses of the Gold Medallion Home development in Villa Heights, Ind. Baseboard electric equipment fully meets the heat requirements of these low-cost homes in an area with northern temperatures. The use of electric heat for these homes, selling in the \$10,000 to \$11,000 class, was brought about by the cooperative efforts of the builders, the electric utility, the electrical contractor and the manufacturer. The equipment used was made by Markel Electric Products Inc.

NEW WESTINGHOUSE SUPER-HI™



FLUORESCENT LAMPS GIVE $2^{\frac{1}{2}}$ TIMES THE LIGHT OF ORDINARY FLUORESCENTS



Westinghouse has developed a new Super-Hi fluorescent lamp that gives up to $2\frac{1}{2}$ times as much light as regular fluorescent lamps . . . and nearly double the light of Hi-OutputTM lamps. So now you can get much more light without increasing the number of fixtures. That means lower initial cost because you have fewer fixtures to buy . . . lower maintenance cost, too, because you have fewer fixtures to maintain. These powerful new lamps are ideal for medium and high bay industrial and outdoor lighting.

- √ Special cooling chambers maintain proper vapor pressure to give longer life . . . more light.
- √ Longer life cathodes add to lamp life.

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- √ New Chromium-Vanadium plating on lead wires retards end-darkening.
- √ Smooth slim design gives uninterrupted brightness all around the tube . . . much lighter weight for safe and easy handling.
- √ Interchangeable . . . can be used in any fixtures designed for new extra Hi-Output lamps.
- √ More reliable starting even in damp weather . . . special silicone coating over exterior surface of the lamp prevents collection of moisture.

All Westinghouse fluorescent lamps have "Ultralume" phosphors to assure maximum brightness for the life of the lamp. There's one for every industrial, business and home use. Specify Westinghouse on every lamp order. Call your local authorized Westinghouse agent or write—Westinghouse Lamp Division, Bloomfield, N. J.

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P-W

SUPPORTS CUT COSTS

Add Your Name to our ever-growing list of satisfied customers who say with a twinkle in their eye: "We saved by using P-W."



Supports—Expanded and solid metal Trays and Ladder—in Galvanized Steel and Aluminum, to hold Power and Control Cables and Instrument Tubing. Specified and Approved for All Types of Governmental, Utility and Industrial Jobs.

The only system that eliminates field cutting and provides 100% Galvanized Coverage. Goes up like erector set. Pick out piece and install with drive rivets. (Does away with measuring, cutting, drilling and time-consuming bolts, nuts and washers or hinges.)

Write today for New Catalog No. 858 and literature. Save Money by Contacting our Representative or P-W direct.

P-W INDUSTRIES, INC., Manufacturers Duncan and Melrose Sts., Philadelphia 24, Pa.

Considering the three types of fuel-electricity, gas and oil, the selection was narrowed to twoelectricity or oil, because of the economic factors involved. Taken into consideration were: the added cost of insulation for electric heating, the savings in the cost of installing the equipment (including storm windows and storm doors), the savings effected by eliminating the chimney, the digging and installation of an oil tank, the digging for a gas line, the flue, the extra work needed to leak-proof the roof, and the room or space necessary for central oil equipment. From the study, the builders decided to install electric baseboard heating equipment in the first model home as a test case.

The Indianapolis Power and Light Company approved a connected load of 7500 watts after reviewing the plans and Heat Loss calculations for each of the rooms of the home. This connected load consisted of:

Bathroom—one 500-watt baseboard heating unit.

Living room—one 2000-watt unit. Each bedroom (three in house)—one 1250-watt unit.

Kitchen and dining area—one 1250-watt unit.

Each of the baseboard heating units operates at 240 volts and has a built-in thermostat. Considerable savings result from this thermostat feature, because it eliminates the need to install a remote wall-type thermostat.

The model home was constructed of wood framing with wood siding. Built on a 4-in. concrete slab with asphalt tiling, it is completely in-



HOST of the Illinois Chapter, IAEI midyear meeting is Harry Frieden, Inspector Moline, III. (left). Frieden is shown discussing the Chapter's two day program with L. E. Peterson, Sycamore, III. (middle) and Samuel R. Todd, Chicago (right).

HOW TO MAKE A MINT OF MONEY SELLING EXIDE LIGHTGUARD® UNITS





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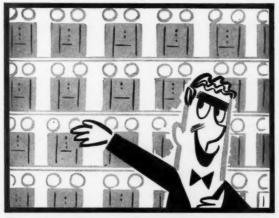
1. Find prospects everywhere. Look for buildings with people in them and where sudden darkness could cause injury, damage or theft. This includes nearly all the commercial, industrial and public buildings in your area.



2. Show the Exide Lightguard. Point out that its superior power capacity means more light-hours in the event of emergency. Genuine Exide battery with built-in charger gives years of trouble-free protection.



3. Demonstrate the Exide Lightguard. Plug it into a light socket, then switch off the power. Show how the Exide Lightguard goes on instantly and automatically. Floods an area with light till power comes back on.



4. Ask how many the customer needs. You'll find most users will buy several—one for each area to be protected. Many orders will run to important money. So selling Exide Lightguard units can be profitable business.

Here's your market:

Every business, factory, office, institution, theater, school, church. If they don't have emergency light now, you can be sure they need it. And they're better off if they buy Exide Lightguard. Why don't you be the one to sell it to them. For information on becoming an Exide Lightguard dealer, write Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.





Because they're no ordinary motors-stators, rotors, windings, electrical varnishes, and bearings used are designed and selected to give you long, trouble-free service under the toughest conditions. Yet, BROOK MOTORS cost no more than ordinary motors -usually cost less! No wonder BROOK MOTORS are praised so highly throughout industry. NEMA Rerate (Open Drip Proof Shown) and Standard Frame Motors, 1 to 600 horsepower, available from warehouse stocks in principal cities. Send for the cost-cutting facts today! **SINCE 1904**

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POWER DISTRIBUTION TRANSFORMERS

TRAN 3 KVA and UP

- · Ultra quiet sound level construction
- To NEMA and ASA Specifications
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- Class B or H high temperature insulation throughout
- Easily accessible terminal connections
- · Additional overload safety factor is built-in by use of more than normal amount of core stock

750 KVA 3 PHASE

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sulated with 6-in, insulation in the ceiling, 4-in, bats in the wall, and with perimeter insulation around the slab foundation.

The first model home of 912 sq. ft was open to the public at 10:00 AM Saturday, April 5th. By Tuesday, April 8th, a total of 16 homes had been sold. No further persuasion was needed to convince the building corporation that electrically heated homes offered advantages to the home owner not available with

other types of heating.

Acme Electric Company, electrical contractors on this job, installed a 150-amp service. The utility company verified that the estimated seasonal cost of heating this home electrically would be between \$130 and \$140. In promotion of home electric heating, the power company established a special general and space heating service rate. The heating is figured at 1.7 cents net per killowatt hour. The outside design temperature in Indianapolis is a minus 8°F. The estimated cost of operation was based on 5400 degree days. Because these 67 homes, and the 69 additional homes that are planned, are considered to be the largest single electrically heated home project in the Midwest, the utility company is keeping accurate information for actual cost and kilowatt hour consumption.

The builder and the utility company have framed and placed in each home a "Certificate of Approval and Warranty". This basically guarantees that-

1. Finest standards have been used in the electrical construction

of the equipment.

- 2. Each piece of electric heating equipment has a warranty against defective materials or workmanship for one year, and that the heart of the equipment (the heating element) is guaranteed for five vears.
- 3. Proper insulation practice has been used in the installation.

4. The heat losses have been scientifically calculated.

5. The Indianapolis Power and Light Company has reviewed the heating work, and that they have inspected it for proper installation and adequate wiring conformity, heat loss and annual operation estimates, and that it has adequate and approved equipment.

Each of the certificates is signed by the Indianapolis Power and Light Company and by Sparks & Russell, the builders.

The builders estimate that a savings of approximately \$700 was





Installed STA-KON terminals have no voids that permit interior attack from corrosive agents or atmospheres. The wire strands and terminal barrel are compressed into a solid mass of exceptional conductivity. Radar, TV and other electronic applications show fewer operational failures when STA-KON terminals are specified.



Fully approved for military aircraft use, STA-KON terminals offer permanent, mechanically-strong, electrically-sound connections. T & B staking tools provide contact pressures between barrel and wire approximating 40,000 psi. Physical design of the T & B stake mark is such that it cannot be pushed out . . . the barrel never relaxes its pressure on the wire. Millions of STA-KON terminals have efficiently withstood the buffeting and vibration of near-sonic jet fighter speeds.



Self-insulated STA-KON terminals prevent metal-to-metal contact between crowded or overlapped leads. Colorcoded nylon insulation can't slip loose ... withstands heat, cold, oils and gasoline. A single operation with T & B SHURE STAKE® tools simultaneously stakes terminal to wire with terrific pressure, and keeps the insulation permanently in place.

For complete information on the complete line of T & B STA-KON terminals and connectors, write for Bulletin #61.

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The complete line of T & B fittings for conductors and raceways is sold only by recognized electrical wholesalers. It's our way of assuring you the service and savings of a friendly local source. Call him for all your electrical needs.

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MANUFACTURERS OF FINE ELECTRICAL PITTINGS SINCE 1898

What is a FAIR

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To be **FAIR**, both your customer and you must profit.



NATIONAL PRICE SERVICE

suggests fair resale prices for electrical materials and tells you what they cost from day to day.

Keep current.

Be FAIR to yourself.

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Сотра	ny		******			
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City			Zone	State		



NEW JERSEY State Council of Electrical Contractors Associations held their annual convention in Atlantic City and adopted a resolution calling for state licensing of electrical contractors to eliminate individual licensing by each municipality for contractors. The 200 delegates representing more than 600 electrical contractors in New Jersey elected the officers shown above: (seated I-r) Herbert Husser, Paterson, Counsel; Irving Blancke, Linden, 2nd Vice President; Nicholas S. Romano, Passaic, President; William Ackerman, Paterson, 1st Vice President; (standing I-r) Edward M. Hasse, Englewood, Treasurer; Wallace J. Collier, Maplewood, Financial Secretary; and Nathan Yust, Newark, Recording Secretary.

effected in the construction of this electrically-heated home by installing electric heating equipment, as against installing a central gas or oil forced-air furnace. Although figuring the added cost for insulation, builders figure that their savings were a result of eliminating the chimney, the absence of duct work, fuel tank, extra pipes, or a cumbersome furnace. Compactness in space was accomplished by the elimination of an extra room to house a furnace in this one-floor home.

NISA News

D. D. Bishop, of Montreal (Quebec) Armature Works, has been named general chairman of the 1949 International Convention of NISA, to be held in Montreal at Hotel Queen Elizabeth May 17-20.

Hector Roberge, of H. Roberge Inc., Quebec, will be chairman of tours; John Clermont, of Leduc Electrical, Ltd., Montreal, will head the arrangements committee; Paul Barbeau of Montreal Armature Works, will be in charge of exhibits; Jerry Sauve, transportation; and Cliff Ainsworth, Ainsworth Electric, Toronto, Ont., program.

Mrs. D. D. Bishop has been named chairman of the women's program. A meeting of the convention com-



mittee was held in Montreal on July 31 at Hotel Queen Elizabeth. Also attending were H. C. Blenkhorn, of Blenkhorn & Sawle, Ltd., St. Catharines, Ont.; Joseph M. Harrington, NISA executive vice president; editor of NISA News, Horace B. Barks; and Mesdames Blenkhorn, Harrington, Bishop, Barbeau, Roberge and Clermont.

. . . A joint meeting of Ontario and Quebec chapters will be held at Hotel Queen Elizabeth on Sept. 29. At that time the new Quebec Chapter will be presented with its charter. NISA now has 40 chapters. including three in Canada.

. . . . Herbert Schreiber, service manager of Louis Allis Co., and Rand Winters of American Steel & Wire, were speakers on the program of the July 21 meeting of Western Michigan Chapter, at Hall Electric Co.. Muskegon.

Letters have been mailed by the executive secretary to members of Southwestern Chapter to see if enough members are interested to make it feasible to hold the group's spring meeting in Monterrey, Mex-

Electric motor service shops were urged to expand their physical facilities and to institute training programs for engineering personnel by NISA President Paul M. Sievert, Sievert Electric Co., Chicago, at a meeting of King Coal Chapter in Mount Vernon, Ill. on July 10 at Parkmore Grill.

Former NISA President William Giles reviewed his convention talk on "The Best Ways to Strip and Clean a Motor." Reports of the program and commercial exhibits of the recent New Orleans Convention of NISA were given by Harold Chase, of Giles Armature & Electric Works, Marion, Ill. and Robert McNamara, of Insulation & Wires, Inc., St. Louis, respectively.

Another former national president, Charles J. Covington, of Dowzer Electric Machinery Works, Mount Vernon, was host to the tour at a plant tour before the meeting.

Other speakers included NISA executive vice-president Joseph M. Harrington and NISA News editor Horace Barks.

A joint meeting of Western Michigan and Great Lakes chapters of NISA was held on August 18 at Barker-Fowler Electric Co., Lansing, Mich. Frank Jones of Browning Manufacturing Co. discussed





your pocket or pouch.

"LOK-IT" MAKES SCREW-ON WIRE **CONNECTOR JOINTS SO TIGHT YOU** CANNOT UNSCREW THEM WITH YOUR BARE HANDS!

All you do is slip "LOK-IT" over the knurled end of a "Hi" Bakelite Wire Connector and twist! "LOK-IT" does the work - saves your fingers . . . gives you a locking-grip on any wire combination . . . every job will pass the most critical inspection.

"LOK-IT" Wrench is an exclusive "Hi" product, specially designed to fit 2 sizes of "Hi" Screw-On Bakelite Wire Connectors - No. Hi-4 and Hi-6 ("standard" and "large" construction wiring sizes).

You can't buy "LOK-IT" . . . See your distributor for FREE "LOK-IT" . . . one packed in every No. Hi-46 carton . . . or write to us for your FREE WRENCH!

TWO SIZES (Hi-4 and Hi-6)

NOW U.L. APPROVED FOR 600 VOLT USE (Comply with 1956 National Electrical Code)

AND THAT'S NOT ALL-also U.L. listed as pressure cable connectors for general use in all types of branch circuit wiringconduit, armored cable, non-metallic sheath, open and fixture hanging . . . machine hook-up, appliance repair, etc.

MILLIONS IN USE!

MAIL TODAY FOR 1958 "HI" CATALOG

OTHER "HI" QUALITY

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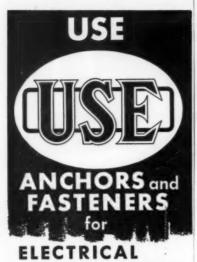
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TOGGLE BOLT for HOLLOW WALLS

Assures a secure installation to all hollow wall material. Spring action opens toggle head when inserted.



Permits fast shallow hole fastening.

U. S. E. anchors and fasteners are made to accurate specifications assuring ease of installation.

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EXPANSION BOLT CO.

DEPT. EC-9



INTERNATIONAL Convention Committee of NISA includes, from left, John Clermont, arrangements; Paul Barbeau, exhibits; D. D. Bishop, general chairman; Hector Roberge, tours.

"The Engineering of the Application of Belts and Pulleys."

New Orleans Chapter met on July 22 to install its new officers, including Harry Mentrup of Nola Electric, president; Barney Oufnac, Advance Electric, Inc., vice-president: and Edward K. Richardson. of Industrial Electric Service, Inc., secretary-treasurer.

Florida members of NISA gathered at Lido Biltmore Club, Sarasota, August 16, 17 to hear George Martin, Essex Wire Co. engineer, discuss "Insulations and Compatible Systems."

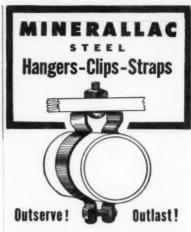
A directory of members of Southwestern Chapter has been issued by the executive secretary, Miss Ann Hickman, Box 546, Fort Worth, Tex.

Salina, Kans, will be the site of the October 3-4 meeting of Heart of America Chapter, according to Bill Pickett, secretary.

. . . Hotel Chamberlain, Old Point Comfort (Fort Monroe), Va., will house members of Southeastern Chapter at their annual conference, scheduled October 2-4.

Technique of Stage Lighting

Scientific, engineering, and artistic aspects of stage lighting are all comprehensively dealt with in this book, on "The Technique of Stage Lighting" divided into four parts: scientific basis; adaptation and control of light; art of stage lighting; and practical lighting of stage productions.



Minerallac Cable, Conduit and Messenger Har ers are STEEL. Easier, quicker to install; per speedy, compact wiring; economical. Also in Ev dur... Porcalain Insulating Bushings availab

Jiffy STEEL Clips (Pipe-clamp) require only one screw, nail or bolt; rib-strengthened; for hanging pipe, conduit, BX cable, mounting cells, etc. Millions in use.

Steel Straps for Messenger-cable services on outlet boxes; may be used in conjunction with hangers.

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Ranges: 0-50 Megohms and 0-30 Ohms, or 0-10,000 ohms. True Ohmmeter movement independent of generator voltage. Furnished with leather carrying case and test leads.

Write for Bulletin No. 465

HERMAN H. STICHT CO., INC. 27 PARK PLACE NEW YORK 7. N. Y This second edition incorporates latest information on new and improved types of dimmers and lighting control systems, including autoransformer, magnetic amplifier, electronic valve, and other types of dimmers, also various types of preset, remote control, and selective systems. Lamp data have also been revised and brought up-to-date, and additions made covering stage lighting apparatus.

This reference will be of invaluable assistance to the lighting and electrical engineer, who needs more than experience and ingenuity to guide him, and the electrical contractor, who will turn with relief to a work which shows him how to cope with so many widely differing problems in installing theatre or color lighting systems.

The Technique of Stage Lighting, by R. Gillespie Williams, Director of Color Research, Century Lighting, Inc., New York City; Second Edition; 198 pages; Pitman Publishing Corp., 2 West 45th Street, New York 36, N. Y.; \$7.50.

Correction

On page 87 of the May 1958 issue, under 4.22 b, the paragraph should be corrected to read "Branches shall have single-pole (thermal-magnetic, magnetic-hydraulic) circuit breakers of size noted" conforming with a similar phrase under 4.21 on the preceding page.

J. N. Pierce

J. Norman Pierce, 77, founder and senior partner of Pierce Electric Company, prominent Chicago electrical contracting firm, died suddenly of a heart attack July 23, 1958.

A pioneer electrical contractor, Mr. Pierce founded his firm 54 years ago and did the electrical installations in many of Chicago's major buildings as well as the electrification of the Illinois Central Railroad.

He was a former village president of Western Springs, Ill.; a past president of the Electrical Contractors Association of City of Chicago, the Electric Association of Chicago, and the former Electric Club of Chicago. He was recently chairman of the Electrical Insurance Trustees of Chicago.

His three sons, Norman, John H., and Robert Pierce, all partners in the Pierce Electric Company, sur-





Load capacity of cable in conduit can be increased ... added years of service life can be obtained ... by proper use of conduit ventilating cable supports in vertical risers where heat concentrates.

PLM Catalog 301 shows how to do it . . . lists types of ventilating supports for both new and existing installations, and with or without flanges to support potheads. It also lists and illustrates the full line PLM standard armored cable terminators and splices as well as PLM unit package terminating and splicing kits. Write for your copy. PLM Products, Inc., 3875 W. 150th St., Cleveland 11, Ohio.

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Latrobe Electrical Products

"Latrobe" Floor Boxes and Wiring Specialties are designed for quick, easy installation and superior performance. Stripped of complex assembly, "Latrobe" Products do their job smoothly and economically.

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Two models—Right Angle and Parallel support. Each in 10 sizes to handle pipe or conduit V_2 " thru 4".



Sturdy and dependable for hanging pipe to conduit V_2 ", 34", and 1" to steel beams up to 36" thick. Larger sizes for larger pipe.

Non-Adjustable Floor Box

Represents the last word in unique design, neat appearance, fewest number of parts, and least amount of labor to install.



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Pipe or Conduit Hangars
Insulator Supports
Cable Supports . . Fish Wire
Staple and Cable Clips

Write for new catalog

Sales Representatives in all principal cities



DATES AHEAD

International Association of Electrical Inspectors—Western Section, Sheraton-Cadillac Hotel, Detroit, Mich., September 7-10; Northwestern Section, Billings, Mont., Sept. 15-17; Southwestern Section, Southern California, September 22-24; Canadian Section, Montreal, Quebec, Canada, October 3-4; Eastern Section, Laurels Hotel, Monticello, N. Y., October 13-15; Southern Section, Miami, Fla., October 20-22.

International Association of Electrical Leagues—Annual Conference, Shoreham Hotel, Washington, D. C., October 1-3.

Technical Conference on Electrical Maintenance — Pre-conference product display evening of October 2, King Edward Hotel, Toronto, Canada, October 3-4.

Canadian Electrical Manufacturers Association — Annual convention, Sheraton-Brock Hotel, Niagara Falls, Canada, October 8-10.

Florida Association of Electrical Contractors — Annual Convention and 6th Electrical Trade Show, Hotel George Washington, West Palm Beach, Fla., October 9-11.

National Electronics Conference, Inc.

—Hotel Sherman, Chicago, Ill., October 13-15.

National Society of Professional Engineers—Fall meeting, St. Francis Hotel, San Francisco, Calif., October 23-25.

American Institute of Electrical Engineers—Fall General meeting, Penn-Sheraton Hotel, Pittsburgh, Pa., October 27-31.

National Electrical Manufacturers Assn. — Annual conference, Hotel Traymore, Atlantic City, N. J., November 10-14.

National Electrical Contractors Assn.,
—Annual convention and National
Electrical Exposition, Adolphus Hotel, Dallas, Texas, November 16-21.

American Society of Mechanical Engineers—Annual meeting, Hotel Statler and Sheraton McAlpin Hotel, New York, N. Y., November 30-December 5.

14th International Heating & Air Conditioning Exposition — Commercial Museum & Convention Hall, Philadelphia, Pa., January 26-29, 1959.

National Electrical Week — An allindustry event, February 8-14.

Electrical Associates, Inc. — National Electrical Week luncheon, Sheraton-Astor Hotel, New York, N. Y., February 10.

2nd Biennial Electrical Trade Conference & Exposition — Sponsored by Electrical Trade Institute of Washington, Sheraton Park Hotel, Washington, D. C., February 17-18.

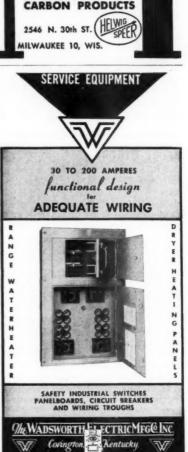
2nd National Lighting Exposition— Coliseum, New York, N. Y., March 1-4.

Industrial Electrical Exposition—Sponsored by Essex Electrical League, Olympic Park, Newark, N. J., Week of March 2d.

Edison Electric Institute—Annual Convention, New Orleans, La., April 5-9.

National Industrial Service Assn.—Queen Elizabeth Hotel, Montreal, Canada, May 17-21.





WRITE FOR FREE CATALOG

Among the Manufacturers

Headquarters Announcements

Pyle-National Co., Chicago, has acquired the Steber Mfg. Co., of Broadview, Ill., which will continue as a division of Pyle-National.

Federal Pacific Electric Co., Newark, N. J., has acquired all outstanding stock of Federal Pacific Mfg. Co. of Toronto, Canada.

Perfect-Line Mfg. Corp., Hicksville, N. Y., has acquired all rights from Titeflex, Inc., to manufacture Lineflex cable.

National Electric Products Corp., Pittsburgh, Pa.—Assistant vice presidents: R. D. Holabird, Norman L. Bost, Earl M. Nelson.

T. J. Cope Div., Rome Cable Corp., Collegeville, Pa.—Allan M. Ziegler, vice president; Robert M. Wade, sales manager; Fred Ullberg, Jr., new products manager.

Electric Auto-Lite Co., Toledo, Ohio—Fremont Fisher, general sales manager; A. N. Kaiser, chiefengineer—both with Electrical Products Group.

I-T-E Circuit Breaker Co., Philadelphia, Pa.—Paul A. Garrison, sales manager, Special Products

Sel-Rex Corp., Nutley, N. J.—Sid Mitwol, general manager, Rectifier Division.

Thomas A. Edison Industries, West Orange, N. J.—William H. Balentine, vice president.

General Electric Co., Plainville, Conn.—A. A. Watson, manager, marketing and assemblies components sales; R. C. Wilson, manager, manufacturing and plant operations.—both with Distribution Assemblies Dept.

Square D Co., Detroit, Mich.—Robert E. King, distribution equipment sales manager.

Pittsburgh Standard Conduit Co., Pittsburgh, Pa.—John A. Eitel, advertising manager.

Electrical Fittings Corp., Woodside, N. Y.—Dick Noel, vice president.

Electric Storage Battery Co., Exide Industrial Div., Philadelphia, Pa.—Robert J. Muth, field sales manager.

Thomas & Betts Co., Elizabeth, N. J.—Horace K. Corbin, Edward C. Hewitt, Karl Kempf and Edward D. Thomas, directors.

Owatonna Tool Co., Owatonna, Minn.—John Mullenmaster, vice president and director of sales.

Better installations in less time

Simple, quick to install

BLACKHAWK 540 BOX SUPPORT

stays rigidly in place

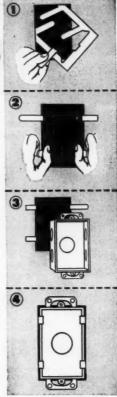
The Blackhawk No. 540 one piece box support slips into the wall opening and tabs are bent back to hold it in place. After the switch box is installed, the tabs are bent to the inside of the box squeezing it firmly in place. It's that simple and quick.

It makes a permanent installation because the Blackhawk 540 box support is a large single piece . . . providing rigid, unified support. It does not wiggle or saw because it is parallel to the wall.

For simple, quick, permanent switch box installation, specify Blackhawk No. 540 box support. Ask your electrical distributor for Blackhawk.



BLACKHAWK INDUSTRIES DUBUQUE, IOWA





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Easy-to-Install, Economical "Package" for Efficient Ventilation

All-around satisfaction is the sure result when powerful, quiet and dependable "Buffalo" Sky-Vent Power Roof Ventilators are installed in plants and commercial buildings. No duct work is required, simplifying

installation. High capacities (1000 to 250,000 cfm) mean fewer expensive roof openings. Peak-efficiency "Buffalo" Propeller Fans provide greatest economy. Insure the success of *your* roof exhaust installations with "Buffalo" Sky-Vents. Write today for Bulletin FM-2345 and prices.

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It bites es it twists. Precision inner cam action delivers a lightning-fast, hammer-like blow with each half revolution . . . drills clean holes quicker and with far less effort into brick, concrete, dense aggregate, tile, etc. Bits last longer, because there's no bind or drag.

. NO HEAVY PRESSURE NEEDED!



New, Positive-Grip
"ROTO-LOCK" CHUCK

No wrenches or set screws. Turn the knurled collar and a cam locks the bit in a solid, vibration-proof grip that assures straight, true holes.

COMPLETE LOW PRICE KITS - TWO RUGGED MODELS

For frequent or occasional drilling, with semi-permanent or instant connection to your drill. Complete kits include attachment and most-used bit sizes. Or order individual attachments with your choice of IDEAL Bits, FROM 3/16" to 1".



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Yardney Electric Corp., New York—Saul Padwo, assistant to the vice president.

Omark Industries, Inc., Portland, Ore.—Donald R. Walker, advertising manager.

Kaiser Aluminum & Chemical Corp., Electrical Conductor Div., Oakland, Calif.—Gillette N. Houck, manager of promotion and technical development; J. Carl Ferguson, general sales manager.

Blackhawk Mfg. Co., Milwaukee, Wis.—Robert M. Tetzlaff, sales

promotion manager.

Minneapolis-Honeywell Regulator Co., Industrial Products Group, Minneapolis, Minn.—George M. Muschamp, group vice president—engineering; O. B. Wilson, group vice president—marketing; John M. Wilson, director of engineering; R. L. Mallory, group sales manager; J. A. Robinson, sales manager, Brown Instruments Div.

Regional Appointments NEW ENGLAND

Edwards Company: William D. Suits, district representative, Boston office.

Nelson Electric Mfg. Co.: E. G. Norton Co., representative, Boston area.

MIDDLE ATLANTIC

Owatonna Tool Co.: Robert Allyn, head of eastern sales division.

Allis-Chalmers Mfg. Co.: Ralph L. Haney, manager, Philadelphia district; Charles E. Dandois, manager. Allentown, Pa., district.

Rome Cable Corp.: W. Richard Copp, sales representative, New York City district sales office.

I-T-E Circuit Breaker Co.: Karl Kelly, manager, new Buffalo, N. Y., office.

SOUTH ATLANTIC

Nelson Electric Mfg. Co.: William D. Johnson, representative in Washington, D. C.

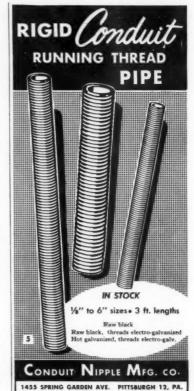
Berko Electric Mfg. Corp.: Gover & Co., representative in North and South Carolina.

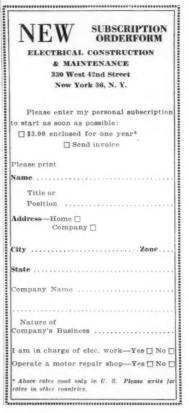
Tomic Sales and Engineering Co.: W. H. Berry and Co., sales representatives in North and South Carolina.

Frink Corp.: I. H. Topp, Jacksonville, sales representative in Northern Florida.

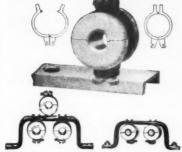
Allis-Chalmers Mfg. Co.: Y. S. Hogg, manager, Tampa, Fla., district office.

I-T-E Circuit Breaker Co.: H. Lee Hamilton, district manager, Miami district office at Coral Gables, Fla.; John W. Harrawood,









Nested conductor racks are compact and scientifically designed to carry cables equidistant from center to center. Available in 2, 3, 4, 5 and 6 bushing racks.

EFFICIENCY ELECTRIC & MFG. CO. EAST PALESTINE, ONIO



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Another First for thiel in the New Hump Drive NAIL-IT STRAP. THE HUMP HAS A STURDY MEAD TO INSURE EASY-DRIVE WITHOUT BENDING OR-PULLING OUT. MADE OF #8 HEAVY WIRE. ZINC PLATING PREVENTS RUST.

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district manager, Columbia, S. C. office; J. C. Schneck, district manager, Baltimore, Md., office.

EAST CENTRAL

General Controls Co.: Norbert T. Grainer, regional manager in Midwest, office in Cleveland.

Wolverine Tube: Travis E. Mosier, sales representative, Chicago Metropolitan area.

C & D Batteries, Inc.: Power Operated Products, representative in Cincinnati, Ohio.

Tomic Sales and Engineering Co.: S. C. Goodling, representative in Chicago, Northern Illinois, and Northwestern Indiana; Winton H. Hansen, representative in Southern Wisconsin, office in Milwaukee.

I-T-E Circuit Breaker Co.: John J. Clark, district manager, Indianapolis, Ind., office.

WEST CENTRAL

Panellit Inc.: Joseph E. Kleuger, Southwest regional sales manager.

Rome Cable Corp.: James W. Campbell, agent in St. Louis, Mo.

WEST

Tomic Sales and Engineering Co.: Smith and Thomas Co., representatives in Seattle, Spokane, and Portland; Peter Shubunka, Western district manager.

Richardson-Allen Corp.: Randolph Engineering Corp., sales representatives in Southern California, Arizona and New Mexico.

Okonite Company: Edward Danielson, Jr., regional manager, West Coast Region.

Touch-Plate Mfg. Corp.: Harvey L. Laughlin, Jr., and John R. Hunter, new sales representatives.

Chester Cable Corp.: J. W. Marsh Co., Los Angeles, representative in Arizona, California, Nevada and Hawaii; Burt C. Porter Co., Seattle, representative in Washington, Oregon, Alaska and portions of Montana and Idaho.

John C. Virden Co.: Clyde E. Dodd, representative in Oregon.

Sorgel Electric Co.: Control Switches, Inc., representative for Southern California.

Weston Instruments: John C. Washington, manager, Los Angeles district.

Chelsea Fan and Blower Co.: John A. Scott Co., Los Angeles, representative in Southern California.

Hitemp Wires, Inc.: C. F. L. Co., representatives in Utah and Wyoming, office in Salt Lake City.

Owatonna Tool Co.: William Murray, head of new western territorial division.





New Onan all-purpose Diesel Electric Plant cuts costs in half!

lower fuel cost, less maintenance, longer life, cut power generation costs with the Onan 3DSL to half that of small gasoline-powered electric plants! For applications requiring an almost continuous supply of electric power, this new unit gives you unmatched economy and season after season of service.

Lighter weight and compact

The new 3DSL is powered by an Onan single-cylinder, air-cooled full-Diesel engine. Available in all standard A.C. voltages and as a 32-volt battery charger. Vacu-Flo cooling, permitting enclosed installations, is standard. The 3DSL has a new mounted muffler, more efficient dry-type air filter, new geared crank, and it's hooded for protection on the job. Smoother running, lighter weight, and compact.

New lower price makes it an even bigger value . . . allows you to "go Diesel" for more power generation needs.



2-cylinder, 5KW ONAN DIESEL

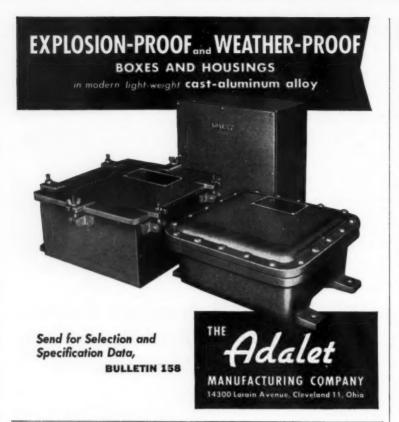
SERIES 5DRP. Air-cooled horizontally - opposed, smooth-running full Diesel engine. All standard vallages available. A higher capacity unit for continuous, low-cost operation.

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Mobile Safety Electrification for Cranes, Monoralls, All Moving Machinery.

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HOSE-McCANN

TELEPHONE CO., INC.

TRANSFORMER NOISE

[FROM PAGE 95]

0.15 in a typical room would reduce sound level 4 decibels; an increase from 0.1 to 0.2 would reduce it 8 decibels or half the loudness. Although office structural materials are highly standardized, an increase in absorbency can be achieved by installing acoustic tile ceilings, draperies and carpeting. Hard, glossy surfaces are highly reflective and should be avoided in very critical noise locations. Such room changes have little effect on noise attenuation in the immediate vicinity of the noise source. If trouble is experienced in this "free" field area an enclosure may be necessary.

NOISE DIRECTIVITY

Directivity refers to concentration of sound emanating from equipment into particular directions, a factor important in the non-reverberant field close to a noise source. A highly directive source transmits its sound energy into a small area, increases the intensity there and raises noise level. For example, a small lighting transformer located in the center of a relatively open space will spread its noise energy over a full hemisphere. The same transformer mounted in a ceiling corner location spreads its energy over one-fourth the area of a hemisphere. This directivity difference alone could increase the noise level close to the unit by six decibels with highly reflective walls. Where possible, it is desirable to spread the sound energy of a transformer over a large free area to reduce noise level close by the unit, as long as the number of people in the noise field is not increased by such a location.

The noise level of installed transformers can be effectively controlled, as noted above. The amount of attention and expense directed to decibel reduction depends upon how closely the desired resultant noise level must approach that specified (rated sound level) for the selected transformer in a free field.



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Enables you to plan
the "small distribution system" needed in the typical modern
home or farm electrical installation from
beginning to end! Methods for determining loads, service entrance feeder size, number and size of branch circuits, number and
type of outlets, etc—a new three-degree
approach for simplifying the whole job of
planning-quick reference tables and other
working helps—sample contract specifications—and much more are given in this
handy manual. By A. C. Bredahl, Westinghouse Electric Corp. 221 pp., 5% x 8, 101
illus., \$4.95.

INDUCTION MOTORS

Single-Phase and Polyphase

Just Published. Here is a thorough and completely practical book on this standard type of rotating energy converter, so popu-lar for industrial, farm, and home-appliance lar for industrial, farm, and home-appliance applications, Written in exceptionally clear style with a minimum of mathematics, the book provides broad coverage of the subject even for those with little technical background. Discusses in detail the principles, construction, performance characteristics, service problems, standards of operation, applications, control, and design. Much attention given to winding... how to install, connect, modify, etc. By Charles S. Sikkind, Purdue Univ. 399 pp., 6 x 9, 206 illus., \$7.50

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To help you win the rich rewards going to today's engineer - managers, here's a guidebook of practical management methods. It provides the engineer with the know-how for undertaking management responsibilities, showing you the how, what, and why of successful high-level decision making in business. The author explains production costs and their control; basic financial transactions; how line and staff operations are coordinated; contributions the engineer can make; and many other aspects. By Roger C. Heimer, Villanova Univ. 453 pp., 6 x 9, 41 illus., \$6.75

HOW TO BECOME A PROFESSIONAL ENGINEER

Shows how to get your professional en-Shows how to get your professional engineer's license more easily – how to apply, how to take oral and written exams, how to write experience record, etc. Explains state laws, how examiners evaluate experience, examination room procedure, and other practical aids. Applicable in all states. By John D. Constance. 262 pp., \$5.50.

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SPECIAL LIGHTING MAINTENANCE TOOLS

TEROM PAGE 921

curate footcandle readings taken in every area.

The first complete cleaning and relamping of all fluorescent lighting in the building was done in April of this year, 18 months after occupancy. Footcandle readings were made again in March, before the cleaning and relamping, and in May, when the job was completed. In spite of the cleanliness of this building, which is about as good as can be found, there were decreases in light output ranging from 14% to 20%. The accompanying table gives complete details.

Fluorescent Service Corporation is the oldest and largest lighting maintenance firm in Florida. It has had to sell the idea of lighting maintenance by contract from the beginning. This was a tough job initially. Gradually, however, public acceptance has grown until lighting system owners in the Tampa area generally accept it as the sound and economic method of keeping their lighting systems efficient and in first class operating condition. Thus the company's growth has been slow, but sound and continuous. With modern lighting systems growing in importance, and concurrently in size and complexity. contract lighting maintenance becomes more and more the logical and practical solution to management. The continued growth and success of Fluorescent Service Corporation therefore seems assured.



CONTRACTORS visit the distributor and manufacturer exhibits. Left to right: Francis Wells, president, Western Electrical Distributors Co., Reno, Nev.; Robert Jackson, electrical contractor, Elko; Gene Pickrell, Fluorescent Fixtures of California, Sacramento; and H. R. Rowland of H. R. Rowland Electric Co., Sparks, Nev.

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EMPLOYMENT OPPORTUNITIES— \$24.00 per inch, subject to Agency Commission.

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MFRS. REPRESENTATIVE

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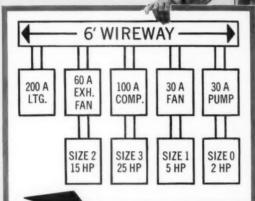
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MID-SEPTEMBER 1958

PRICE 2 50

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COMPANY AND TRADE NAME DIRECTORY

PRODUCT SELECTION DATA

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- E: Recessed Incandescent Luminaire; concave CONTROLENS* for high level Lo-Brite* lighting...
- F: Nos. 641-643 HIBAY* reflectors; protective drip shield; 400 W. and 1000 W. mercury vapor lamps...
- G: REALITE*: PRISMALUME* CONTROLENS*
- H: No. 415 Bracket-type outdoor luminaire
- 1: Nos. 04250-04251; outdoor substations (incandescent or mercury lamps)...
- J: No. C-824: Incandescent surface attached corridor light...

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Air Conditioners - unit type

Alarms - fire

Ammeters - panel, pocket, recording

Annunciators - drop, lamp, electric reset

Batteries - wet and dry

BELLS - hazardous location bells, buzzers and

horns; also standard types

Blocks - terminal

BOXES — metal outlet and switch

Boxes — all other types

Breakers - oil and air circuit

Bulbs — incandescent

BUS-DUCT

Cabinets - cutout, distribution, fuse

panelboard, transformer

CABLE - rubber-covered Cable - all other types

Capacitors

Centers - load and distribution

Compounds

Conduit - clay, flexible metallic

CONDUIT - flexible, non-metallic, rigid steel

Connectors — all types

CORD — twisted or parallel

Cord - all other types

Cutouts

DRILLS - portable electric

Duct - power, underfloor

Fans — attic, ventilator, propellor; blowers

FANS - exhaust

Fittings - conduit and cable, all kinds

FIXTURES - commercial and industrial incandescent

commercial and industrial fluorescent

Fixtures - floodlighting, street lighting

Fixtures - hazardous location, vaportight

FUSES - renewable plug

Fuses - all other types

Hangers - conduit, fixture, outlet box

HEATERS - space Horns - signal

LAMPS - fluorescent tube

Lamps — incandescent

Lamps — all other types Lugs - solderless

METERS — watt-hour testing

MOTORS - AC single phase

Motors — all other types

PANELBOARDS

Outlets - hanger

Plugs - all types

Receptacles - all types

RELAYS - electronic industrial

SIGNALS - nurse and doctor call

Sirens - electric

Sockets - all types

Solenoids - AC, DC, rotary

STARTERS - AC and DC motor

Switchboards

SWITCHES — combined circuit breaker and

starting

Switches - all other types

Switchgear - metal-clad

SYSTEMS - intercommunicating

Systems - calling, signaling, public address

TAPE - friction

Tape - all other types

Tools - hand and power, all types

TRANSFORMERS

Tubes - electronic

Ventilators

Voltmeters - panel, pocket, portable

WIRE - rubber-covered

Wire - all other types

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ELECTRICAL PRODUCTS GUIDE

VOL. 57 NO. 9A

MID-SEPTEMBER, 1958

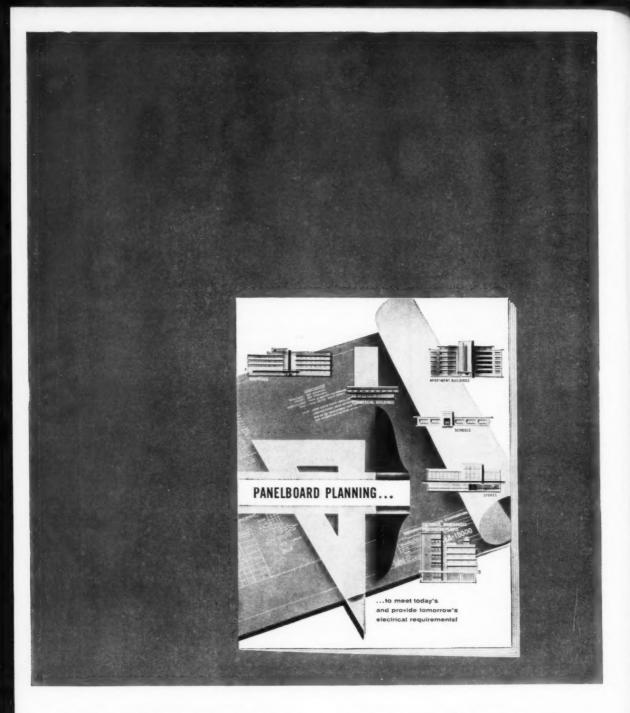
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HOW TO JISE THIS BOOK

ELECTRICAL CONSTRUCTION and MAINTENANCE

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Callina	197.11	CENEDAL OUTLETÉ	DANCIS CIDCUITS AND MISCELLANDOUS
Ceiling	Wall	GENERAL OUTLETS	PANELS, CIRCUITS, AND MISCELLANEOUS
0	0	Outlet	Lighting Panel Power Panel
®	-®	Blanked Outlet	
0		Drop Cord	Branch Circuit; Concealed in Ceiling or Wall
(E)	-E	Electric Outlet; for use only when circle used alone might be confused with columns, plumbing symbols, etc	Branch Circuit; Concealed in Floor Branch Circuit; Exposed
(E) (C) (C) (C) (P) 5	စုစုစု <i>စု</i>	Fan Outlet Junction Box Lamp Holder	Home Run to Panel Board. Indicate number of circuits by number of arrows. Note: Any circuit without further designation indicates a two-wire circuit. For a greater number of wires indicate as follows: -##- (3 wires) ### (4 wires), etc. Feeders. Note: Use heavy lines and designate by num-
③	-Ops	Outlet for Vapor Discharge Lamp Exit Light Outlet	ber corresponding to listing in Feeder Schedule. Underfloor Duct and Junction Box. Triple System. Note: For double or single systems eliminate one or
(S)	-⊗ -©	Clock Outlet (Specify Voltage),	two lines. This symbol is equally adaptable to auxili- ary system layouts.
		CONVENIENCE OUTLETS	© Generator
=	•	Duplex Convenience Outlet Convenience Outlet other than Duplex	Motor *
=€	1,3	1=Single, 3=Triplex, etc	① Instrument
-		Weatherproof Convenience Outlet	Power Transformer (Or draw to scale.)
1	WP	Range Outlet	Controller
-6	PR	Switch and Convenience Outlet	Isolating Switch
=	3	Radio and Convenience Outlet	AUXILIARY SYSTEMS
	R	Special Purpose Outlet (Des. in Spec.)	Pushbutton
(9	Floor Outlet	□ Buzzer
()	SWITCH OUTLETS	Do Bell
S		Single Pole Switch	→ Annunciator
	2	Double Pole Switch	Outside Telephone
	3	Three Way Switch	Interconnecting Telephone
	4	Four Way Switch	Telephone Switchboard
	0	Automatic Door Switch	Bell-Ringing Transformer
-	E	Electrolier Switch	D Electric Door Opener
	K	Key Operated Switch	FD Fire Alarm Bell
	ip.	Switch and Pilot Lamp	F Fire Alarm Station
_		Circuit Breaker	City Fire Alarm Station
	св	Weatherproof Circuit Breaker	FA Fire Alarm Central Station
	WCB	Momentary Contact Switch	FS Automatic Fire Alarm Device
	МС	Remote Control Switch	W Watchman's Station
	RC	Weatherproof Switch	Watchman's Central Station
	WP	Fused Switch	H Horn
	S _F	Weatherproof Fused Switch	N Nurse's Signal Plug
3	WF	SPECIAL OUTLETS	Maid's Signal Plug
- €a,!	o,c,etc b,c,etc o,c,etc	Any standard symbol as given above with the addition of a lower case subscript letter may be used to designate some special variation of standard equipment of particular interest in a specific set of architectural plans. When used they must be listed in the Key of Symbols on each drawing and if necessary further described in the specifications.	Radio Outlet Signal Central Station
			12-Ño. 18W-3/4"C., or designate by number corresponding to listing in Schedule. Da,b,c Special Auxiliary Outlets. Subscript letters refer to notes on plans or detailed description in specifications.

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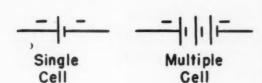


General Carbon block

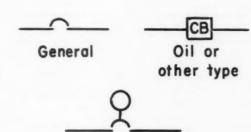


Electrolytic

BATTERIES



CIRCUIT BREAKERS



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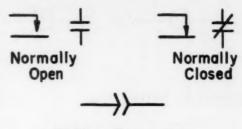
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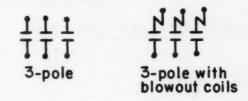


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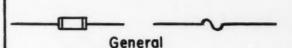


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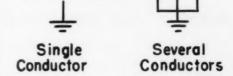
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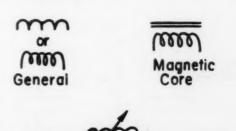
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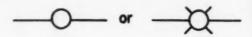
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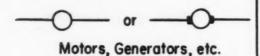
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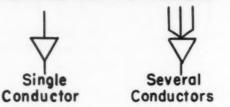
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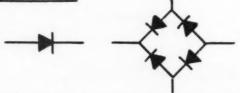
MACHINES, ROTATING



POTHEADS (Cable Terminators)

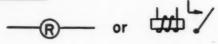


RECTIFIERS

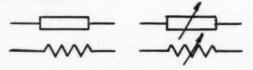


Half Wave Full Wave (Bridge)

RELAYS



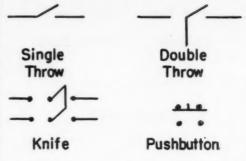
RESISTORS



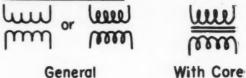
Fixed

Variable

SWITCHES



TRANSFORMERS



WIRING



Conductors





Crossing of conductors, not connected



Crossing of conductors, connected



Joining of conductors, not crossing



Grouping of conductors

TABLE 2 – ALLOWABLE CURRENT-CARRYING CAPACITIES OF INSULATED COPPER CONDUCTORS IN AMPERES TABLE 1 - ALLOWABLE CURRENT-CARRYING CAPACITIES OF INSULATED COPPER CONDUCTORS IN AMPERÈS Not More than Three Conductors in Raceway or Cable or Direct Burial

Type RU Type RU Type Type RUW RUW				
				-
(14-2) (14-2	Size	SA		Asbestos
Type Type RH-RW RH-RW		2	Type A M(14-8)	_
Thermo- plastic Type				
Type TW				
20 25 25 25 25 25	14 12 10 8		30 40 55 70	30 40 70
80 105 120 140 165	@ ₹ ₩₩₩		95 120 145 165 190	95 120 145 165 190
195 225 260 300	0 0000		225 250 285 340	100
340 375 420 515	250 300 400 500		:::::	:::::
575 630 655 680 730	500 700 800 900		1::::	:::::
780 935 890 1065 980 1175	1250			
1070	750	2		
CORRECTION FACTORS FOR ROOM TEMPERATURES OVER 30C. 86F.	L.	oʻ		FOR ROOM TEMPERATURES OVER 30C. 86F.
.58	104	545		
-		52	-	-
::	158	92	16.	
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		200		
	194	100		
-	346	-	_	_

Table 4 - Number of Conductors in Conduit or Tubing

Rubber Covered, Types RF-2, RFH-2, R, RH, RHH, RHW, RW, RH-RW, RU, RUH and RUW Thermoplastic, Types TF, T and TW One to Nine Conductors

For more than nine conductors see Table 9.

Size	Num	ber o	f Cond	uctors	in O	ne Cor	nduit o	or Tub	ing
MCM MCM	1	2	3	4	5	6	7	8	9
18	1/2	3/2	1/2	34	35	35.	35	%	%
16	1/2	34	1/2	3/2	35	35	34	34	34
14	1/2	1/2	3/2	3/2	34	34	1	1	1
12	35	1/2	1/2	34	%	1	1	1	1%
10	35	34	34	34	1	1	1	134	134
8	35	34	34	1	114	134	134	11/2	11/2
6	35	1	1	11/4	11/2	11/2	2	2	2
4	36	134	*1%	135	11/2	2	2	2	21/2
3	34	134	134	134	2	2	2	21/2	21/2
2	34	134	134	2	2	2	21/2	21/2	21/2
1	34	11/2	11/2	2	21/2	21/2	21/2	3	3
0	1	11/2	2	2	21/2	21/2	3	3	3
00	1	2	2	21/2	21/2	3	3	3	31/2
000	1	2	2	21/2	3	3	3	31/2	31/2
0000	134	2	21/2	3	3	3	31/2	31/2	4
250	134	234	21/2	3	3	31/2	4	4	5
300	11/4	21/2	21/2	3	31/2	4	4	5	5
350	134	3	3	31/2	31/2	4	5	5	5
400	13/2	3	3	31/2	4	4	5	5	5
500	13/2	3	3	31/2	4	5	5	5	6
600	2	31/2	31/2	4	5	5	6	6	6
700	2	31/2	31/2	5	5	5	6	6	
750	2	31/2	31/2	5	5	6	6	6	
800	2	31/2	4	5	5	6	6		
900	2	4	4	5	6	6	6		* *
1000	2	4	4	5	6	6			**
1250	235	5	5	6	6				
1500	3	5	5	6					
1750	3	5	6	6					
2000	3	6	6						

*Where a service run of conduit or electrical metallic tubing does not exceed 50 feet in length and does not contain more than the equivalent of two quarter bends from end to end two No. 4 insulated and one No. 4 bare conductors may be installed in 1-inch conduit or tubing.

Table 9 - Number of Conductors in Conduit or Tubing

More Than Nine Conductors Rubber-Covered Types RF-2, RFH-2, R, RH, RHH, RHW, RW, RH-RW, RU, RUH, and RUW Thermoplastic Types TF, T, and TW *When Specially Permitted by This Code

Size	Maxim	um Num	ber of C	onductor	s in Con	duit or	Tubing
AWG	¾ Inch	1 Inch	1¼ Inch	1½ Inch	2 Inch	2½ Inch	3 Inch
18	12	20	35	49	80	115	176
16	10	17	30	41	68	97	150
14		10	18	25	40	59	90
12			15	21	35	50	77
10			13	17	29	41	64
8				10	17	25	38
6						15	23

*More than nine conductors are permitted in a single conduit for conductors between a motor and its controller; stage pocket and border circuits; sign flashers; elevator control conductors; X-ray control conductors.

Table 5 - Number of Conductors in Conduit or Tubing Lead-Covered Types RL and RHL - 600 V.

	Nu	mbe	rof	Cond	ucto	rs ir	On	· Co	ndui	t or	Tubi	ing
Size AWG MCM	Sing	le C		ctor	2-	Con		or	3-	Conc	ducti	or
	1	2	3	4	1	2	3	4	1	2	3	4
14	1/2	34	%	1	%	1	1	11/4	34	11/4	11/2	11/2
12	1/2	34	34	1	34	1	11/4	11/4	1	11/4	11/2	2
10	1/2	34	1	1	34	11/4	11/4	11/2	1	135	2	2
8	1/2	1	11/4	11/2	1	11/4	11/2	2	1	2	2	21/2
6	34	134	13/2	11/2	11/4	11/2	2	21/2	114	21/2	3	3 .
4	34	134	11/2	11/2	11/4	2	21/2	21/2	11/2	3	3	31/2
3	34	134	134	2	11/4	2	21/2	3	11/2	3	3	31/2
2	1	114	11/2	2	11/4	2	21/2	3	11/2	3	31/2	4
1	1	11/2	2	2	11/2	21/2	3	31/2	2	31/2	4	5
0	1	2	2	21/2	2	21/2	3	31/2	2	4	5	5
00	1	2	2	21/2	2	3	31/2	4	21/2	4	5	5
000	114	2	21/2	21/2	2	3	31/2	4	21/2	5	5	6
0000	11/4	21/2	21/2	3	21/2	3	31/2	5	3	5	6	6
250	134	21/2	3	3					3	6	6	
300	13/2	3	3	31/2					31/2	6	6	
350	11/2	3	3	31/2					31/2	6	6	
400	11/2	3	3	31/2					31/2	6	6	
500	11/2	3	31/2	4					4	6		
600	2	31/2	4	5								
700	2	4	4	5								
750	2	4	4	5								
800	2	4	5	5								
900	21/2	4	5	5								
1000	21/2	5	5	6								
1250	3	5	5	6								
1500	3	5	6	6								
1750	3	6	6									
2000	31/2	6	6									

The above sizes apply to straight runs or with nominal offsets equivalent to not more than two quarter-bends.

Table 11 - Combination of Conductors

For groups or combinations of conductors not included in the Tables 4 to 9, it is recommended that the conduit or tubing be of such size that the sum of the cross-sectional areas of the individual conductors will not be more than the percentage of the interior cross-sectional area of the conduit or tubing shown in the following table:

Per Cent Area of Conduit or Tubing

	Nu	mber	of Co	nduct	ors
	,	2	,	4	Over
		- 4	3	-	-
Conductors (not lead covered)	53	31	43	40	40
Lead-covered conductors	55	30	40	38	35
For rewiring existing raceways for increased load where it is impracticable to increase the size of the raceway due to					
structural conditions	60	40	50	50	50

See Note to Table 13 for size of conduit or tubing for combinations of conductors not shown in Table 4.

Table 12 - Dimensions and Per Cent Area of Conduit and of Tubing Areas of Conduit or Tubing for the Combinations of Wires Permitted in Table 11.

						Area - Squa	re Inches				
	Internal			Not Lea	d Covered			Le	ad Covere	d	-
Trade Size	Diameter Inches	Total 100%	1 Cond. 53%	2 Cond. 31%	3 Cond. 43%	4 Cond. and Over 40%	1 Cond. 55%	2 Cond. 30%	3 Cond. 40%	4 Cond. 38%	Over 4 Cond. 35%
3/2 3/4	.622	.30	.16	.09	.13	.12	.17	.09	.12	.11	.11
34	.824	.53	.28	.16	.23	.21	.29	.16	.21	.20	.19
1 -	1.049	.86	.46	.27	.37	.34	.47	.26	.34	.33	.30
11/4	1,380	1.50	.80	.47	.65	.60	.83	.45	.60	.57	.53
11/2	1.610	2.04	1.08	.63	.88	.82	1.12	.61	.82	.78	.71
2	2.067	3.36	1.78	1.04	1,44	1,34	1.85	1.01	1,34	1,28	1.18
21/2	2,469	4.79	2.54	1.48	2.06	1.92	2.63	1.44	1.92	1.82	1.68
3	3.068	7.38	3,91	2.29	3.17	2.95	4.06	2.21	2.95	2.80	2.58
31/2	3.548	9.90	5.25	3.07	4.26	3.96	5.44	2.97	3.96	3.76	3.47
4	4.026	12.72	6.74	3.94	5.47	5.09	7.00	3.82	5.09	4.83	4.45
5	5.047	20.00	10.60	6.20	8.60	8.00	11.00	6.00	8.00	7.60	7.00
6	6.065	28.89	15.31	8.96	12.42	11.56	15.89	8.67	11.56	10.98	10.11

Table 13 - Dimensions of Rubber-Covered and Thermoplastic-Covered Conductors

Size	Types RF-2, R RHH, RHW,		Types TF, T, RUH**	
AWG	Approx. Diam.	Approx. Area	Approx. Diam.	Approx. Area
MCM	Inches	Sq. Ins.	Inches	Sq. Ins.
18	.146	.0167	.106	.0088
16	.158	.0196	.118	
14 14 12 12	2/64 in171 3/64 in204* 2/64 in188 3/64 in221*	.0230 .0327* .0278 .0384*	.131	.0135
10	.242	.0460 .0760	. 168	.0224
6	.397	.1238	.323	.0819
4	.452	.1605	.372	.1087
3	.481	.1817	.401	.1263
2	.513	.2067	.433	.1473
1	.588	.2715	.508	.2027
0	.629	.3107	.549	.2367
00	.675	.3578	.595	.2781
000	.727	.4151	.647	.3288
0000	.785	.4840	.705	.3904
250	.868	.5917	.788	.4877
300	.933	.6837	.843	.5581
350	.985	.7620	.895	.6291
400	1.032	.8365	.942	.6969
500	1.119	.9834	1.029	.8316
600	1,233	1.1940	1.143	1.0261
700	1,304	1.3355	1.214	1.1575
750	1,339	1.4082	1.249	1.2252
800	1,372	1.4784	1.282	1.2908
900	1,435	1.6173	1.345	1.4208
1000	1,494	1,7531	1,404	1,5482
1250	1,676	2,2062	1,577	1,9532
1500	1,801	2,5475	1,702	2,2748
1750	1,916	2,8895	1,817	2,5930
2000	2,021	3,2079	1,922	2,9013

*The dimensions of Type RW wire and RHH wire. Also, these dimensions to be used for new work in computing size of conduit or tubing for combinations of wires not shown in Table 4.

** No. 14 to No. 2.

No. 18 to No. 8, solid; No. 6 and larger, stranded.

The dimensions of rubber-covered conductors in column 3 of Table 13 are to be used in computing the size of conduit or tubing for new work for combinations not shown in Table 4. The dimensions in the last column of Table 13 may be used only for rewiring existing raceways.

Table 16 - Dimensions of Lead-Covered Conductors Types RL, RHL, and RUL

Size		ngle luctor	Cond	vo .		iree luctor
AWG MCM	Diam, Inches	Area Sq. Ins.	Diam. Inches	Area Sq. Ins.	Diam. Inches	Area Sq. Ins
14	.28	.062	.28× .47	.115	.59	.273
12	.29	.066	.31x .54	.146	.62	.301
10	.35	.096	.35 x .59	.180	.68	.363
8	.41	. 132	.41x .71	.255	.82	.528
6	.49	.188	.49 x .86	.369	.97	.738
4	.55	.237	.54 x .96	.457	1.08	.916
2	.60	.283	.61×1.08	.578	1.21	1.146
1	.67	.352	.70 x 1.23	.756	1.38	1.49
0	.71	.396	.74 x 1,32	.859	1,47	1.70
00	.76	.454	.79 x 1.41	.980	1,57	1.94
000	.81	.515	.84 x 1.52	1,123	1.69	2,24
0000	.87	.593	.90 x 1.64	1.302	1.85	2.68
250	.98	.754			2.02	3.20
300	1.04	.85			2,15	3.62
350	1.10	.95			2.26	4.02
400	1.14	1.02			2.40	4,52
500	1.23	1.18			2.59	5,28

Note — No. 14 to No. 8, solid conductors; No. 6 and larger, stranded conductors. Data for 2/64-inch insulation not yet compiled.

Varnished-Cambric Insulated Conductors

Type V

The insulation thickness for varnished-cambric conductors, Type 'V, is the same as for rubber-covered conductors, Type R, except for Nos. 14 and 12 which have 3/64-inch insulation for varnished-cambric, and 2/64-inch insulation for rubber-covered conductors and for No. 8 which has 3/64-inch insulation for varnishedcambric, and 4/64-inch insulation for rubber-covered conductors. See table in section 93101. Tables 4 and 5 may, therefore, be used for the number of varnishedcambric insulated conductors in a conduit or tubing.

Note: The above tables give the nominal size of conductors and conduit or tubing recommended for use in computing size of conduit or tubing for various combinations of conductors. The dimensions represent average conditions only, and while variations will be found in dimensions of conductors and conduits of different manufacture, these variations will not affect the computation.

CODE TABLES (continued)

Table 20 - Conductor Sizes and Overcurrent Protection for Motors

The current values in Column 1 are to be taken from Tables 21 to 24, including footnoiss, but the values shown for running protection in Columns 5 and 6 must be modified if nameptate full lead current values are different. Conductor sizes abown in Columns 2 and 3 may be smaller for certain motors. The current values shown in Columns 5 and 6 must be reduced by 8 per cent for all motors other than open type motors marked

. No. 1	2	3	5	6		7 Menu	num Allawahia	Rating or Setting	of Branch Circ	9 mit Protective De	vices	10
ill load urrent ting of motor mperes	Minimum si conductors raceways. F or more condu in raceways conductors i or other ins tions, see ta 1 and 2	or 4 ctors , for n air	For Running of Mi Maximum cating of non- adjustable protective devices.	g Protection otors Maximum setting of adjustable protective devices.	Single-p cage and Full vol or reac Code in	DE LETTERS hase squirrel synchronous. tage, resistor tor starting, riters F to V clusive. CODE LETTERS as above.	with COD Single-phi cage and : Full volt; or reactor letters B it Auto trans Code letters WITHOUT CI (Not more th Squirrel c: chronous, a start, hig	E LETTERS ase, squirrel synchronous, age, resistor start, Code b E inclusive, former start, F to V inclusive, DDE LETTERS an 30 Amperes) age and syn- uto transformer h reactance rel cage.	WITH CODE Squirre synchre transfo Code let inc WITHOUT C (More than Squirrel c chonous, a	I Cage and onous auto mer start, ters B to E lusive. ODE LETTERS 30 Amperes) age and syn- uto transformer the reactance tel cage.	WITH CUT C	E LETTERS lors code ter A. DDE LETTER wound rolor itors.
	Type R Type T	Гуре КН	Amperes	Amperes	Fuses	Circuit Breakers (Non- adjustable Overload Trip)	Fuses	Circuit Breakers (Mon- adjustable Overload Trip)	Fuses	Circuit Breakers (Non- adjustable Overload Trip)	Fuses	Circuit Breakers (Non- adjustabl Overload Trip)
1 2 3	14 14 16	14 14 14	2 3 4	1.25 2.50 3.75	15 15 15	15 15 15	15 15 15	15 15 15	15 15 15	15 15 15	15 15 15	15 15 15
5 6	14 14	14 14 14	8 8	5.0 6.25 7.50	15 20	15 15 15	15 15 15	15 15 15	15 15 15 15	15 15 15	15 15 15	15 15 15
8 9	14 14 14	14 14 14	10 10 12	8.75 10.0 11.25	25 25 30	20 20 30	20 20 25	15 20 20	20	15 20 20	15 15 15	15 15 15
10 11 12	14 14 14	14 14 14	15 15 15 20	12.50 13.75 15.00 16.25	30 35 40	30 30 30 40	25 30 30 35	20 30 30 30	20 25 25 30	20 30 30 30	15 20 20 20	20 20 20
13 14 15	12 12 12	12 12 12	20 20	16.25 17.50 18.75	40 45 45	40	35 40	30 30	30 30 30	30 30	20 25 25	30 30
16 17 18	12 10 10	12	20	20.00 21.25 22.50	50 60 60	40 50 50	40 45 45	40 40 40	35 35 40	40 40 40	25 30 30	30 30 30
19 20 22	10 10 10	10 10 10	25 25 25 30	22.50 23.75 25.00 27.50	60 60 70	50 50 70	50 50 60	40 60 50	40 40 45	40 40 50	30 30 35	30 30 40
24 26 28	10	10 8 8	30 35	30.00 32.50	80	70 70 70	60 70	50 70	50 60	50 70	40	40
30 32 34	8 8	8 8	35 40 40 45	35,00 37.50 40,00 42.50	90 90 100 110	100 100 100	70 80 80 90	70 70 70 70	60 60 70 70	70 70 70 70	45 45 50 60	50 50 50 70
36 38 40	6	6	45 50	45.00 47.50 50.00	110 125 125	100 100 100	90 100 100	100 100 100	80 80 80	100 100 100	60 60 60	70
42 44 46	6	6	50 50 60	52.50 55.00 57.50	125 125 150	125 125 125	110 110 125	100 100 100	90 90 100	100 100 100	70 70 70	70 70 70 70
48	1	6	60	60.00 62.50	150 150	125 125	125 125	100 100 125 125	100 100 110	100	80	100
52 54 56 58	4 4 3	4 4	70 70 70 70 78	65.00 67.50 70.00 72.50	175 175 175 175	150 150 150 150	150 150 150 150	125 125 125	110 125 125	125 125 125 125	90 90 90 90	100 100 100 100
60 62 64	3 3 3	-	80 80 80	75.00 77.50 80.00	200 200 200	150 175 175	150 175 175	125 125 150	125 125 150	125 125 150	90 100 100	100 100 100
66 68 78	2 2	4 4	80 90	82.50 85.00 87.50	200 225 225	175 175 175	175 175 175 175	150 150 150	150 150 150	150 150 150	100 110 110	100 125 125
72 74	2 2 2	3 3 3	90	90.00	225	200 200 200	200	150 150	150 150	150 150	110 125	125 125 125
76 78 80 82	1	3 3 2	100 100 100 110	95.08 97.50 100.00 102.50	250 250 250 250 250	200 200 200 225	200 200 200 225	175 175 175 175 175	175 175 175 175 175	175 175 175 175	125 125 125 125	125 125 125
84 86 88	1	2 2 2	110 110 110	105.00 107.50 110.00	250 300 300	225	225 225 225 225	175 175 200	175 175 200	175 175 200	150 150 150	150 150 150
90 92 94	0	2 2	110 125 125	112.50 115.00 117.50	300 300 300	225 225 250 250 250 250	225 250 250	200 200 200	200 200 200	200 200 200	150 150 150	150 150 150
96 98 100	0	1	125 125	120.00 122.50	300	250	250 250	200 200 200 225	200 200	200 200	150 150	150 150
105 110 115	00 00 00	0 0	125 150 150 150	125.00 131.50 137.50 144.00	350 350 350 350	250 300 300 300	300 300 300 300	225 250	200 225 225 250	200 225 225 225 250	150 175 175 175	150 175 175 175
120 125 130	000 000 000	000	150 175 175	150.00 156.50 162.50	400 400 400	300 350 350	300 350 350	250 250 300	250 250 300	250 250 300	200 200 200	200 200 200
135 140 145	0000 0000	00 00 000	175 175 200	169.00 175.00 181.50	450 450 450	350 350 400	350 350 400	300 300 300	300 300 300	300 300 300	225 225 225	225 225 225
150 155	0000 0000 250	000	200 200 200	187.50 194.00	450 500	400 400 400 500	400 400 400	300 350 350	300 350	300 350	225	225 250
160 165 170 175	250 250 300	000 0000 0000 0000	225 225 225 225	206.00 206.00 213.00 219.00	500 500 500 600	500 500 500	450 450 450 450	350 350 350 350	350 350 350 350	350 350 350 350	250 250 300 300	250 250 300 300
180 185 190	300 300 300	0000 0000 250 250		225.00 231.00 238.00	600 600	500 500 500	450 500 500	400 400 400	400 400 400	400 400 400	300 300 300	300 300 300
195 200 210	350 350 400	300	250 250 250 250 250 250	244.00 250.00 263.00	600 600	500 500 600	500 500 600	400 400 500	400 400 450	400 400 500	300 300 350	300 300 350
220 230	400 500	300 300	300	275.00	110	600 600 600	600 600 600	500	450 500	500 500	350 350	350 350 480 400
240 250 260 270	500 500 600 600	350 350 400 400	300 300 350 350	300.00 313.00 325.00 338.00	1	257		500 500 600 600	500 500 600 600	500 500 600 600	400 400 400 450	400 500
280 290 300	600 700 700	500 500 500	350 350 400	350.00 363.00 375.00	1 11	- 1	-	600 600 600	600 600 600	600 600 600	450 450 450	500 500 500
320 340 360	750 900 1000	600 600 700	400 450 450	400.00 425.00 450.00		-	-	- 1			500 600 600	500 600 600
400	1250 1500	750 900	500	475.00 500.00							600 600	600 600
420 440 460	1750 2000	1000 1250 1250	600 600 600	525.00 550.00 575.00			-	1.5	1		100	

Table 21 -- Full-Load Currents in Amperes*

	Direct Curre		
HP	115V	230V	550V
1/4 1/2 3/4	3. 3.8 5.4 7.4	1.5 1.9 2.7 3.7	1.6
1	9.6	4.8	2.0
1½	13.2	6.6	2.7
2	17	8.5	3.6
3	25	12.5	5.2
5	40	20	8.3
7½	58	29	12
10	76	38	16
15	112	56	23
20	148	74	31
25	184	92	38
30	220	110	46
40	292	146	61
50	360	180	75
60	430	215	90
75	536	268	111
100		355	148
125		443	184
150		534	220
200		712	295

^{*}These values of full-load currents are for motors running at usual speed.

Table 22 - Full-Load Currents in Amperes*

HP	115V	230V	550V
1/4	4.4	2.2	
1/4	5.8	2.9	
16	7.2	3.6	**
1/2	9.8	4.9	**
%	13.8	6.9	
1	16	8	
1½	20	10	
. 2	24	12	**
3	34	17	
5	56	28	11
7½	80	40	21
10	100	50	26

^{*}These values of full-load currents are for motors running at usual speeds and motors with normal torque characteristics. Motors built for especially low speeds or high torques may have higher full-load currents, in which case the nameplate current ratings should be used.

To obtain full-load currents of 208 and 200-volt motors, increase corresponding 230-volt motor full-load currents by 10 and 15 per cent, respectively.

Table 24 - Full-Load Current*

	Squi	rrel-Cog	e and V		pe Synchronous T bund Rotor tUnity Power Fo Amperes					
HP	110V	220V	440V	550V	2300V	220V	440V	550V	2300 V	
% %	4 5.6 7	2 2.8 3.5	1 1.4 1.8	.8 1.1 1.4						
11/2 2 3	10	5 6.5 9	2.5 3.3 4.5	2.0 2.6 4						
7½ 10		15 22 27	7.5 11 14	9						
15 20 25		40 52 64	20 26 32	16 21 26	7	54	27	22	5.4	
30 40 50		78 104 125	39 52 63	31 41 50	8.5 10.5 13	65 86 108	33 43 54	26 35 44	6.5 8 10	
60 75 100		150 185 246	75 93 123	60 74 98	16 19 25	128 161 211	64 81 106	51 65 85	12 15 20	
125 150 200		310 360 480	155 180 240	124 144 192	31 37 48	264	132 158 210	106 127 168	25 30 40	

| 200 | 480 | 240 | 192 | 48 | 210 | 165 | 40 |
| For full-load currents of 208 and 200-volt motors, increase the corresponding 220-volt motor full-load current by 6 and 10 per cent, respectively. *These values of full-load current are fer motors running at speeds usual fer belted motors and motors with normal torque characteristics. Motors built for especially low speeds or high torques may require more running current, in which case the nameplate current rating should be used. †For 90 and 80 per cent P.F. the above figures should be multiplied by 1.1 and 1.25 respectively.

Table 32 - Isolation by Flevation Distance of Live Parts Above the Floor or Other Working Surface

		ical Clearance rded Parts
Voltage Between Phases	Feet	Inches
600	8	0
2300	8	0
6600	8	0
11000	9	0
22000	9	3
33000	9	6
44000	9	10
66000	10	5
88000	11	0
110000	11	7
132000	12	2

Table 33 - Working Space

	Minimum Horizontal Clearance of Unguarded Parts			
Voltage Between Phases	Feet	Inches		
600	3	2		
2300	3	3		
6600	3	4		
11000	3	6		
22000	3	9		
33000	4	. 0		
44000	4	4		
66000	4	11		
88000	5	6		
110000	6	1		
132000	6	8		

MAXIMUM NUMBER OF CONDUCTORS IN BOXES

			-	
Deep Boxe	18			
Box Dimensions Trade Size		Number No. 12		
1 1/2 x 3 1/4 octagonal	5	5	4	0
1 1/2 x 4 octagonal	8	7	6	5
1 1/4 x 4 square	9	7	6	4
1 1/2 x 4 square	11	9	7	5
1 1/2 x 4 11/16 square	16	12	10	8
2 1/8 x 4 11/16 square	20	16	12	10
2 x 1 3/4 x 2 3/4	5	-4	4	
2 1/2 x 1 3/4 x 2 3/4	6	6	. 2	
3 x 1 3/4 x 2 3/4	7	7	6	

Where there is not sufficient space for a deeper box, four No. 14 AWG conductors may enter a box provided with cable clamps and containing one or more devices on a single mounting strap.

Shallow Boxes of Less	Than 11/2 "	Depth	
Box Dimensions Trade Size	Maximum No. 14	Number of No. 12	Conductors No.10
3 1/4	4	4	3
4	6	6	4

The above tables apply where no fittings or devices, such as fixture studs, cable clamps, hickeys, switches or receptacles are contained in the box. Where one or more fixture studs, cable clamps, or hickeys are contained box. Where one or more fixture studs, capie clamps, or inckeys are contained in the box, the number of conductors shall be one less than shown in the tables, with a further deduction of one conductor for one or several flush devices mounted on the same strap. A conductor running through the box is counted as one conductor and each conductor originating outside the box and terminating inside the box is counted as one conductor. Conductors of which no part leaves the box are not be be counted in the above computation. If single flush boxes are ganged, and each section is occupied by a flush device or combination of flush devices on the same strap, the limitations will apply to each section individually.

Other Combinations

Chief Committees	
Size of Conductor	Free Space Within Box for Each Conductor
No. 14	2. cubic inches
No. 12	2.25 cubic inches 2.5 cubic inches
No. 8	cubic inches

DC CIRCUIT CHARACTERISTICS

Ohm's Law:

$$E = IR$$
 $I = \frac{E}{R}$ $R = \frac{E}{I}$

E = voltage impressed on circuit (volts)

I = current flowing in circuit (amperes)

R = circuit resistance (ohms)

In direct current circuits, electrical power is equal to the product of the voltage and current:

$$P = EI = I^*R = \frac{E^*}{R}$$

P = power (watts)

E = voltage (volts)

I = current (amperes)

R = resistance (ohms)

AC CIRCUIT CHARACTERISTICS

The instantaneous values of an alternating current or voltage vary from zero to a maximum value each half cycle. In the practical formulae which follow, the "effective value" of current and voltage is used, defined as follows:

Effective value = 0.707 × maximum instantaneous value

Impedance:

Impedance is the total opposition to the flow of alternating current. It is a function of resistance, capacitive reactance and inductive reactance. The following formulae relate these circuit properties:

$$X_L = 2\pi f L \qquad X_C = \frac{1}{2\pi f C} \qquad Z = \sqrt{R^2 + (X_L - X_C)^2}$$

X_L = inductive reactance (ohms)

X_c = capacitive reactance (ohms)

Z = impedance (ohms)

f = frequency (cyles per second)

C = capacitance (farads)

L = inductance (henrys)

R = resistance (ohms)

 $\pi = 3.14$

Ohm's Law for AC Circuits:

$$E=1\times Z$$
 $I=\frac{E}{7}$ $Z=\frac{E}{1}$

POWER FACTOR

Power factor of a circuit or system is the ratio of actual power (watts) to apparent power (volt-amperes), and is equal to the cosine of the phase angle of the circuit:

$$PF = \frac{actual\ power}{apparent\ power} = \frac{watts}{volts \times amperes} = \frac{KW}{KVA} = \frac{R}{Z}$$

KW = kilowatts

KVA = kilovolt-amperes = volt-amperes × 1,000

PF = power factor (expressed as decimal)

SINGLE-PHASE CIRCUITS

$$KVA = \frac{EI}{1,000} = \frac{KW}{PF} \qquad KW = KVA \times PF$$

$$I = \frac{P}{E \times PF}$$
 $E = \frac{P}{I \times PF}$ $PF = \frac{P}{E \times I}$

THREE-PHASE CIRCUITS, BALANCED STAR OR WYE

$$I_N = 0$$
 $I = I$, $E = \sqrt{3}E$, = 1.73 E,

$$E_p = \frac{E}{\sqrt{3}} = \frac{E}{1.73} = 0.577E$$

 $I_{\rm N} =$ current in neutral (amperes)

1 = line current per phase (amperes)

Ip = current in each phase winding (amperes)

E = voltage, phase to phase (volts)

E_p = voltage, phase to neutral (volts)

THREE-PHASE CIRCUITS, BALANCED DELTA

$$I=1.732\times I_{p} \qquad I_{p}=\frac{1}{\sqrt{3}}=0.577\times I$$

 $E=E_{r}$

POWER: BALANCED 3-WIRE, 3-PHASE CIRCUIT, DELTA OR WYE

For unity power factor (PF = 1.0):

$$I = \frac{P}{\sqrt{3}E} = \frac{0.577P}{E}$$
 $E = \frac{P}{\sqrt{3} \times I} = \frac{0.577P}{I}$

P == total power (watts)

For any load:

$$P = 1.732 \times E \times I \times PF$$
 $VA = 1.732 \times E \times I$

$$E = \frac{P}{PF \times 1.73 \times I} = \frac{0.577 \times P}{PF \times I}$$

$$1 = \frac{P}{PF \times 1.73 \times E} = \frac{0.577 \times P}{PF \times E}$$

$$PF = \frac{P}{1.73 \times I \times E} = \frac{0.577 \times P}{I \times E}$$

VA = apparent power (volt-amperes)

P = actual power (watts)

E = line voltage (volts) phase to phase

I = line current (amperes)

POWER LOSS: ANY AC OR DC CIRCUIT

$$P = I^2R$$
 $I = \sqrt{\frac{P}{R}}$ $R = \frac{P}{I^2}$

P = power heat loss in circuit (watts)

1 = effective current in conductor (amperes)

R = conductor resistance (ohms)

Conduit Spacings

SPACINGS IN INCHES BETWEEN CENTERS OF CONDUITS

The light face figures are the minimum dimensions to provide clearance between lockmuter. The more liberal spacings printed in bold face type should be used whenever possible.

Site	1/2	34	1	134	11/2	2	21/2	3	31/2	4	41/2	5	(
14	13%										***		
	750	***					***	***	***	***		***	
34	1%	1%					*** .						
	1975	11.4	***				***	***		***	***	****	
1	11/2	1%	134					***			***		
	12.71	1/6	1 / A	***	***					***		***	
116	134	13%	2	21/4		***						***	
	1.12	21/4	21/3	23%			•••	***	***	•••	***	***	,
11/2	115/6	21/6	23/4	2%	2%		***			***		***	
	1750	21/4	2%	22	550	***	***	***	***	***	***	***	
2	23/6	23/4	21/2	234	2%	31/6	***			***		***	
	11 3 5 5 B	21/2	2%		2/2	37/	0,00	***	•••	***	***	***	
21/2	2%	2%	2¾	-3	31/4	3%	3%	***				***	
	1 1 Can	2%	3	152V	张 5米学	The c		***	•••	***	***	***	
8	213/6	215/4	31/4	35/4	3%	3%	4	43%			***	154	
		316	3%	3.65	336	4	5 CH.	三人	***	***	***	***	
31/2	3%	314	3%	3%	3%	41/16	43/6	4%	413/4	***	***	***	١.
	市金田	31/2	3%	0.5	5-7-6	4/0	4%		97		***	***	
4	3%	3%	311/6	313/6	41/4	43%	45%	415/6	514	5%	***		
	のない	3%	4	4)4	-	20.43		836	三自分	2 V	***	***	1
41/2	3%	3%	4	41/4	4%	4%	4%	51/4	5%	5%	61/2	***	
		41/4	AVA	4/5	13(2)		2 J. W.	346	Ų.	0.00	970	***	
5	41/6	41/4	4%	4%	4%	5	51/4	51/4	5%	61/4	61/2	613/4	
	111	41/5	4%	2/2	F155	3.7	皇5大张	6	0/4/3	1000	No.	- 77 Y	
6	4%	41/6	5	51/4	5%	5%	5%	63/6	61/2	613/6	71/4	71/4	1
		51/4	5/4	* / //	146	1.0	127 15	3.3	27	14/4	100		40.2

APPROXIMATE DIAMETERS

													_
tocknut Bushing Conduit	11/6	136	111/6	23/4	2%	3	3%	43/4	413/4	5%	6	611/4	715/4
Bushing	1	11/4	11/2	1%	21/6	256	31/4	3%	43%	5	5%	614	7%
Conduit	- %	11/6	1%	111/6	113/6	2%	2%	31/2	4	41/2	5	5%	6%

Maximum Distance for Wire Runs Without Raceway Support

Wire Size	Not Greater Than (Feet)	Wire Size	Not Greater Than (Feet)
# 18 Awg to #0 Awg	100	#350 MCM to #500 MCM	50
# 00 Awg to #0000 Awg	80	#500 MCM to #750 MCM	40
#.250 MCM to #350 MCM	60	#750 MCM and above	35

Connecting Single-Phase Transformers

Standard Terminal Markings

To simplify the connection of single-phase transformers in banks, all leads brought out of the casing are marked with the letters H or X, H representing the higher voltage and X the lower. Following is the standard for small split-secondary single-phase distribution transformers.

This arrangement, with H1 opposite X4, is known as "additive polarity" All standard transformers have X2 and X3 crossed in-

ternally. A continuity test should be made before connecting to determine the coil groups if

there is no nameplate or drawing showing the terminal markings

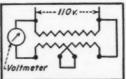
there are no manufacturer's markings on the casing, terminals or leads the markings consist of letters or numbers

other than those shown above, or there is any doubt whatsoever about the correct

terminal arrangement.

Polarity Test

Larger power transformers are usually connected with H1 opposite X1, this arrange-ment being known as "subtractive polarity". The following test may be made to determine polarity:

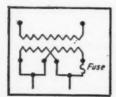


Assume a transformer is to be tested which has a 2 to 1 voltage ratio, low voltage coils in series.

1. Make connections shown above.

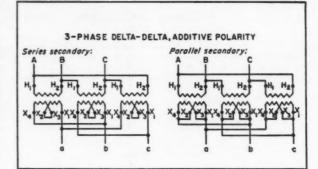
2. Apply 110 volts to high-voltage side. If meter reads 110 plus 55 or 165 volts, polarity is

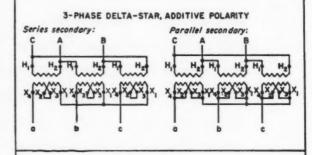
If meter reads 110 minus 55 or 55 volts, polarity is subtractive.

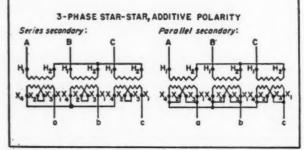


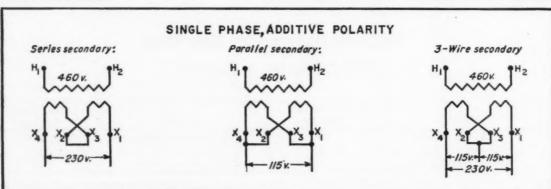
Final Test

connecting Before load, insert a fuse as shown which is just large enough to carry the exciting cur-rent. If the connection is not correct, the fuse will blow.









SINGLE-PHASE CIRCUITS

Amperes for One Kilowatt at Different Power Factors

Volts		POWER FACTOR IN PER CENT											
Volls	100	95	. 90	85	80	75	70						
100	10.0000	10.5263	11,1111	11.7647	12.5000	13.3333	14.2850						
110	9.0909	9.5693	10.1010	10.9652	11.3636	12.1211	12.9870						
115	8.6957	9.1533	9.6619	10.2302	10.8696	11.5942	12.4224						
120	8.3333	8.7719	9.2592	9.8040	10.4166	11,1111	11.904						
125	8.0000	8.4211	8.8889	9.4118	10.0000	10.6667	11.428						
210	4.7619	5.0125	5.2910	5.6022	5.9524	6.3492	6.802						
220	4.5455	4.7847	5.0505	5.3476	5.6819	6.0606	6.493						
230	4.3479	4.5766	4.8309	5.1151	5.4349	5.7971	6.211						
440	2.2727	2,3923	2.5252	2.6738	2.8409	3.0303	3.246						
550	1.8182	1.9139	2.0202	2,1390	2.2728	2.4242	2.597						
	(Breeze, and	-											
1100	0.9091	0.9569	1.0101	0.0695	1.1364	1.2121	1.298						
2200	0.4545	0.4785	0.5050	0.5348	0.5682	0.6061	0.649						
2300	0.4348	0.4577	0.4831	0.5115	0.5435	0.5797	0.621						
2400	0.4167	0.4386	0.4630	0.4902	0.5208	0.5556	0.595						
2500	0.4000	0.4210	0.4444	0.4706	0.5000	0.5333	0.571						
6600	0.1515	0.1595	0.1684	0.1783	0.1894	0.2020	0.216						
11000	0.0909	0.0957	0.1010	0.1070	0.1136	0.1212	0.129						
13000	0.0769	0.0810	0.0855	0.0905	0.0962	0.1026	0.109						
25000	0.0400	0.0421	0.0444	0.0471	0.0500	0.0533	0.057						
45000	0.0222	0.0234	0.0247	0.0261	0.0278	0.0296	0.031						
60000	0.0167	0.0175	0.0185	0.0196	0.0208	0.0222	0.023						

THREE-PHASE CIRCUITS

Amperes per Wire for One Kilowatt at Different Power Factors

			POWE	R FACTOR IN PER	CENT		
Volts	100	95	90	85	80	75	70
100	5.7735	6.0774	6.4150	6.7924	7.2169	7.6980	8.247
110	5.2486	5.5249	5.8319	6.1749	6.5608	6.9982	7.498
115	5.0204	5.2847	5.5783	5.9064	6.2756	6.6939	7.172
120	4.8112	5.0645	5.3458	5.6603	6.0141	6.4150	6.873
125	4.6188	4.8619	5.1320	5.4339	5.7735	6.1584	6.598
210	2.7493	2.8940	3.0548	3.2345	3.4366	3.6657	3.927
220	2.6243	2.7624	2.9159	3.0874	3.2804	3.4992	3.749
225	2.5660	2.7010	2.8511	3.0188	3.2075	3,4213	3.665
230	2.5102	2.6423	2.7891	2.9532	3.1378	3.3470	3.586
240	2.4056	2.5322	2.6729	2.8301	3.0070	3.2075	3.436
400	1,4434	1.5194	1.6038	1.6981	1.8042	1.9245	2.062
440	1.3122	1.3812	1.4579	1.5437	1.6402	1.7495	1.874
500	1.1547	1.2155	1.2830	1.3585	1.4434	1.5396	1.649
550	1.0497	1.1050	1.1664	1.2350	1.3121	1.3996	1.499
1100	.5249	.5525	.5832	.6175	.6561	.6998	.749
2100	.2749	.2894	.3055	.3234	.3437	.3666	.392
2200	.2624	.2762	.2916	.3087	.3280	.3499	.374
2300	.2510	.2642	.2789	.2953	.3138	.3347	.358
2400	.2406	.2532	.2673	.2830	.3007	.3208	.343
2500	.2309	.2431	.2566	.2717	.2887	.3079	.329
6600	.0875	.0921	.0972	.1029	.1093	.1167	.124
11000	.0525	.0552	.0583	.0617	.0656	.0700	.075
20000	.0289	.0304	.0321	.0340	.0361	.0385	.041
25000	.0231	.0243	.0257	.0272	.0289	.0308	.033
33000	.0175	.0184	.0194	.0206	.0219	.0233	.025
50000	.0115	.0122	.0128	.0136	.0144	.0154	.016
55000	.0105	.0111	.0117	.0124	.0131	.0140	.015
60000	.0096	.0101	.0107	.0113	.0120	.0128	.013

FEEDERS OR MAINS-

Two-Wire DC or Single-Phase:

Ampere load is equal to the sum of all branch circuit ampere loads supplied by the conductors, adjusted by demand factors in accordance with Sec. 2203 of the National Electrical Code.

Three-Wire DC or Single-Phase:

Ampere load on either outside wire is equal to the sum of all branch circuit ampere loads supplied by the conductor, adjusted by demand factors in accordance with Sec. 2203 of the National Electrical Code.

Ampere load on the neutral is equal to the ampere load on the more heavily loaded outside wire, when that current is 200 amps or less. If the load on either of the outside wires is more than 200 amps, the current in the neutral may be taken as 200 plus 70% of the current in excess of 200 amps.

Four-Wire, Three-Phase:

Ampere load on any phase conductor is equal to sum of all branch circuit ampere loads supplied by the conductor, adjusted by demand factors in accordance with Sec. 2203 of the National Electrical Code.

Ampere load on the neutral is equal to the ampere load on the most heavily loaded phase conductor, when that current is 200 amps or less. Over 200 amps, load on neutral can be taken as 200 plus 70% of the current in excess of 200 amps.

Neutral Feeder Load (Sec. 2203g, NEC):

The load on a feeder neutral conductor shall be taken as the maximum unbalance of the load on the feeder. The maximum unbalance of the load is the maximum connected load between the neutral and any one ungrounded conductor. For 3-wire dc, single-phase ac, or 4-wire, 3-phase ac, demand factor of 70% may be applied to unbalanced load in excess of 200 amperes.

FEEDER CARRYING CAPACITY

$$I = \frac{Load\ Watts}{K \times E \times PF} = \frac{Load\ Volt-Amperes}{K \times E}$$

K = 1 for 2-wire dc or single-phase ac

= 1.73 for 3-wire, 3-phase ac

= 2 for 3-wire dc or single-phase ac

= 3 for 4-wire, 3-phase ac

E = voltage between outside wire and neutral or, if no neutral exists, between any two line wires (volts)

I = current in any line wire except neutral (amperes), which feeder must be rated to carry (check tables of conductor current ratings)

BRANCH CIRCUITS

Two-Wire:

$$I = \frac{\text{total connected load (watts)}}{\text{line voltage (volts)}}$$

I = current load on conductor (amperes)

Three-Wire:

Apply same formula as for two-wire branch circuit, considering each line to neutral separately. Use line-to-neutral voltage; result gives current in line conductors

Electric Range:

2-Wire Circuit:
$$I = \frac{\text{total connected load (watts)}}{\text{line voltage (volts)}}$$

3-Wire Circuit:
$$I = \frac{\text{total connected load (watts)}}{\text{voltage between outside wires (volts)}}$$

Ampere load on the neutral of a 3-wire circuit may be taken as 70% of that on the outside conductor.

Total connected load, or watt load, is the rated wattage of ranges or other cooking appliances up to 134 KW. For units rated higher than 134 KW, the value of watt load is determined from Table 29 of the National Electrical Code.

BRANCH CIRCUIT PANELBOARDS

Two-Wire DC or Single-Phase:

Total connected load (amperes) = sum of branch loads, as determined above. At least 10 amperes should be allowed for each spare or appliance circuit.

Three-Wire DC or Single-Phase:

Same calculations apply as for Two-Wire Panel, applied separately to each side of panel.

Four-Wire, Three-Phase:

The load on any bus, except the neutral, is computed the same as for a two-wire panel. Usually, the load on each of the four busses is taken as that of the most heavily loaded.

DESIGN & LAYOUT DATA (continued)

MATHEMATICS

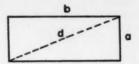
Square:

Area = a^a $d = a\sqrt{2}$



Rectangle:

Area = $a \times b$ $d = \sqrt{a^3 + b^3}$



Parallelogram:

(opposite sides parallel)

Area = ah = ab sin
$$\Phi$$

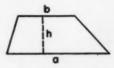
$$d_1 = \sqrt{a^2 + b^2 - 2ab \cos \Phi};$$

$$d_2 = \sqrt{a^2 + b^2 + 2ab \cos \Phi}$$

Trapezoid:

(1 pair of opposite sides parallel)

Area = 1/2h (a + b)



Circle:

Circumference = $\pi d = 2\pi r$

Area = πr^3 = $\frac{1}{4}\pi d^3$ = $\frac{1}{2}r$ × Circumference



Right Triangle:

Area =
$$\frac{1}{2}ab$$

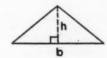
$$c = \sqrt{a^2 + b^2}$$

$$a = \sqrt{c_i - p_i}$$



Oblique Triangle:

Area = 1/2bh



Equilateral Triangle:

Area =
$$\frac{1}{2}$$
ah = $\frac{1}{4}$ a² $\sqrt{3}$

 $h = \frac{1}{2}a\sqrt{3}$



Cube:

Volume = a*



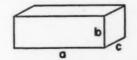
Cylinder:

Volume = area of base × h



Rectangular Cubicle:

Volume = $a \times b \times c$



Functions of an Angle:

sine (sin)
$$\Phi$$
 =

cosine (cos)
$$\Phi$$
 = $-\frac{1}{2}$

tangent (tan)
$$\dot{\Phi} = \frac{\dot{y}}{x}$$

cotangent (cot)
$$\Phi = \frac{x}{y}$$

secant (sec) $\Phi = \frac{r}{x}$

cosecant (csc)
$$\Phi = \frac{r}{V}$$



MOTOR SELECTION CHART

Besic Motor Types	HP Ratings	Mator Operating Classifications	Application Data
	Fractional to several hundred hp.	Scries-wound	For high starting torque, with speed control depending upon load—cranes, hoists, elevators, electric railway cars, locomotives and trucks. In fractional hp. sizes—sewing machines, vacuum cleaners, electric fans, and hair driers (usually the universal type motor).
motors 115, 230 volts d.c.	Fractional	Shunt-wound	For constant-speed or adjustable-speed, with good speed regulation—drives for milling machines, centrifugal pumps, lathes, conveyors, grinders, blowers, shapers and elevators.
	to several thousand hp.	Compound- wound	Offers constant-speed and variable-speed action, with a definite zero load speed and high starting torque. Used with fly wheels on punch presses, power shears, hoists, rolling mill drives and conveyors.
Universal motor 115, 230 volts d.c. or 1 phase a.c.	olts d.c. and several or compensated		A special adaptation of the direct-current series motor. Applications are same as for fractional hp. d.c. series type. In larger sizes, for electric railways.
	Fractional hp.	Shaded-pole induction motor	For small appliances and devices requiring low starting torque—small fans, motion picture projectors and similar small constant-speed devices.
	Fractional	Split-phase start induction motor	For moderate starting torque and constant-speed—small machine tools, oil burner motors and small appliances.
	to 5 hp.	Reactor-start split-phase induction motor	Same as split-phase start induction motor, but requires less starting current.
	Fractional	Capacitor-start split-phase induction motor	For high starting torque, constant speed and low noise—air conditioning equipment, large fans and commercial refrigeration equipment.
Single-phase a.c. motors 110-220-440-550 volts	to 15 hp.	Capacitor- start and run induction motor	Similar to capacitor-start split-phase induction motor, but in larger sizes, with increased power factor and smoother, quieter operation.
		Repulsion motor	For varying-speed, high starting torque and low starting current—pumps, stokers, conveyors, compressors and similar applications when polyphase current is not available.
		Compensated repulsion motor	Similar to repulsion motor, but with improved power factor and constant- or varying speed.
	Fractional to 40 hp.	Repulsion- induction motor	Similar to repulsion motor, but with constant- or varying-speed.
		Repulsion- start induction motor	Similar to repulsion motor, with high starting torque and fairly constant speed.
3-phase a.c.	⅓ to 400 hp.	Squirrel-cage induction motor	For high reliability and efficiency at essentially constant-speed, requiring little maintenance. Depending upon construction, classifications are as follows: normal-torque, normal starting current; normal-torque, low starting current; high-torque, low starting current; high-slip; low starting torque, normal starting current; low starting torque, low starting current. For rotary compressors, machine tools, large fans, light conveyors, milling machines, agitators, elevators, hoists, punch presses, centrifugal pumps and blowers.
208-220-440-550- 2200-2300-4000 volts	½ to several thousand hp.	Wound-rotor (slip-ring) induction motor	For limited speed control and speed adjustments under fluctuating load, with low starting current—conveyors, fans, lift bridges, cranes, hoists and drives for metal-rolling mills.
	20 to several thousand hp.	Synchronous	For power factor correction and for exact slow-speed drives and maximum efficiency on continuous loads above 75 hp.

	TAE	-										PF			
AMPERE	WIRE	SIZE-	-CIRCI	LAR N	IILS	WIRE SIZE-B & S or A.W.C.									
LOAD	500	400	350	300	250	4/0	3/0	2/0	1/8	1	2	3	4	6	
40 50	1104 885	898 719	788 630	669 535	558 447	475 380	378 303	299 240	239 191	188 150	150 120	119 91	94 75	59 47	3
60 70	737 632	599 513	525 450	446 382	372 319	317 271	252 216	200 171	159 136	125 107	100 86	79 68	62 53	39 34	5
80 90	553 491	449	394 350	334 297	279 248	238 211	189	150 133	119 106	94 83	75 67	59 53	47 42		
100	442 402	359 327	315 286	267 243	223 203	190 173	151 138	120 109	95 87	75 68	60 55	47			
120 120	349	299 276	263 242	223 206	186 172	158 146	126 116	100	79 73	63 58					
140 150	316 295	257 240	225 210	191	159 149	136 127	106	86	68						
160	276 260	225 211	197 185	167	140	119	95	75 70	60	R					
189	246 233	200 189	175 166	148	124 117	106 100	84	66							
200 210	221 211	180 171	157 150	134 127	112 106	95 90	76								
220 230	201 192	163 156	143 137	122 116	101	86 83	C	alcı	ulat	ion	b	ase	d d	on c	OF
240 250	184	150 144	131 126	111	93 89			77.7						5 0	100
268 270	170	138 133	121 117	103	80				370					2F).	
280 290	158 152	128 124	112	96 92										eda r e	
300 310	147	120 116	105				-	ire.		aic	JIG	eu	10		ar.
329 330 340	138 134 130	112 109 106										osel		rou	pe

TABLE III. BALANCED LIGHTING LOADS

3- and 4-Wire, 115 Volts 1% drop from supply cabinet to first outlet supplying permanently connected appliance or fixture.

transmin ,		, WATTS (W), V						
MAXIMUM OVERCURRENT	INT	ERMITTENT LO	ADS	CC	INTINUOUS LO			
CIRCUIT	100% F 2-3 C	80% F 4-6 C	70% F 7-9 C	100% F 2-3 C	80% F 4-6 C	70% F 7-9 C		
15 A	15 A 1725 W	12 A 1380 W	10.5 A 1207 W	12 A 1380 W	9.6 A 1104 W	8.4 Amps. 966 Watts		
20 A	20 A 2300 W	16 A 1840 W	14 A 1610 W	16 A 1840 W	12.8 A 1472 W	11.2 A 1285 W		
LOAD	S AND LENGT	HS IN FEET FOR	1% DROP OF	3 AND 4 WII	RE 115 V. CIRI	CUITS		
AMPERE		#10 WIRE		12 WIRE		WIRE		
1 2		946 474		596 298		374 188		
3 4		316 236		198 148		124 94		
5 6		190 158		120 100		76 62		
7		136 118		86 74		54 46		
10		106 94		66 60		42 38		
11		. 78		54 50		34 32		
13		72 68		46 42	28 26			
15		64		40	24			
17		56 52		36 34	6.33			
19		50 48		32 30				
21 27		46 44			1			
23		42 40	6.12	2001/02/03		pased o		
25 26		38 36	1000	TO COLUMN		resistance of 13 or CM-ft at 600		
27		36 34	10000	(140F).		II UI 001		
21		32 32	1					

	TAB 230				20.00				-		AD:	•			
AMPERE	WIRE	SIZE-	CIRCU	LAR N	IILS				WIRE S	SIZE-I	1850	e A.W.	G.		
LOAD	500	400	350	300	250	4/0	3/0	2/0	1/0	1	2	3	4	6	
40 50	710 568	625 500	584 467	530 424	475 380	429 343	364 291	303 242	253 203	208 167	173 139	139 111	113	75 60	41
40 70	473 406	417 357	389 333	353 303	317 271	286 245	243 208	202 173	169 145	139 119	115 99	93 79	75' 64	50 43	
80 90	355 316	312 278	292 259	245 235	238 211	214 191	182 162	151 134	127 113	104	87 77	69 62	56 45		
100 110 120	284 258 237	250 227 208	233 212 195	212 193 177	190 173 158	172 156 143	146 132 121	121 110 101	101 92 84	83 76 69	69 63 58	55			
130	218	192	180	163	146	132	112	93 86	78 72	64					
150	189	168	156 146	141	127	114	97	81 76	67						
170	167	147	137	125 118	112	101	86	71 67							
199 200	149	132	123	112	100	90	77								
210 220	135	119	111	101 96	90 86	82 78									
230 240	123	109		92	83 79	75	C	alc	ulat	ion	s b	ase	d d	on c	op
250 260	114	100		85 81	76 73									5 0	
270 280	105	93		78 76		3,31	P	er (CM-	ft c	at 5	OC	(12	2F).	100
296 300	98 95				1		R	eac	tan	ce	an	d	imp	eda	inc
310 320	92 89									alc	ula	ted	fo	r e	ac
336 340	86 83						W	ire.							
350 360	81						C	one	luct	ors	cle	ose	y g	rou	pe
370 380	77						ir	m	etal	lic	con	dui	1.		13

NOTES:

TABLE I:

Balanced 3-Wire Loads: Drop is 1.15 volts for given length.

2-Wire, 230-Volt Loads: Drop is 2.3 volts for given length.

TABLE II:

For 208-volt, 4-wire "Y" feeders multiply given length by 0.9

For 230-volt, single-phase feeders multiply given length by 0.85

For 460-volt, 3- or 4-wire feeders multiply given lengths by 2.

For aluminum wire multiply given lengths by 0.7 or use length of copper wire which is 2 sizes smaller than the aluminum size under consideration.

TABLE III:

For 2-phase, 3-wire circuits tapped off a 3-phase, 4-wire "Y" service, multiply given lengths by 0.67.

K	LOWA	113 10	HORS	LIOWI	LK
kw	hp	kw	hp	kw	hp
1	1.341	30	40.218	130	174,2
2	2.481	32	42.899	140	187.60
3	4.022	34	45.580	150	201.09
4	5.363	34	48.263	140	214.50
5	4.703	38	50.943	170	227.90
4	8.044	40	53.624	180	241.31
7	9.384	42	56.305	190	254.71
8	10.725	44	58,984	200	268.12
9	12.065	46	41.447	220	294.93
10	13.406	48	64.349	240	321.74
11	14,747	50	47.030	260	348.54
12	14.087	55	73.733	280	375.37
13	17.428	40	80.436	300	402.18
14	17.748	45	87,139	325	435.41
15	20.109	70	93.842	350	469.21
16	21.450	75	100.545	400	436.24
18	22.790	80	107.248	450	403.27
19	25.471	85	113.951	500	470.30
20	26.812	90	120.654	400	804.36
22	29,493	95	127.357	700	938.42
24	32,174	100	134.048	800	1072.48
26	34.854	110	147.47	900	
28	37.537	120	160.87	1000	1206.54

					1
hp	kw	hp	kw	hp	kw
1	.746	30	22.380	130	96.98
2	1.492	32	23.872	140	104.44
3	2.238	34	25.364	150	111.90
4	2.984	36	26.856	140	119.3
5	3.730	38	28.348	170	126.83
6	4,476	40	29.840	180	134.2
7	5.222	42	21.332	190	141.7
	5.968	44	32.824	200	149.20
9	6.714	46	34,316	220	164.13
10	7.460	48	35.808	240	179.0
11	8.206	50	37,300	240	193.9
12	8.952 9.498	55	41.03	280	208.8
14	10.444	40	44.76	300	223.8
15	11,190	45	48.49	325	242.4
16	11.936	70	52.22	350	261.1
17	12.482	75	55.95	400	298.4
18	13.428	80	59.48	450	335.7
19	14.174	85	63.43	500	373.0
20	14.920	90	67.14	400	447.6
22	16.412	95	70.87	700	522.2
24	17,904	100	74.60	800	594.8
26	19.396	110	82.06	900	671.4
28	20.888	120	89.52	1000	746.0

Note: Conversions not given may be obtained by adding appropriate given values.

DE	CIMAL E	QUIVALEN	13
Fraction	Decimal	Fraction	Decimal
1/64 =	0.015625	33/64 =	= 0.515625
1/32 =	0.031250	17/32 =	= 0.531250
3/64 =	0.046875		= 0.546875
	0.062500	9/16 =	= 0.562500
-1	0.078125	37/64 =	= 0.578125
-,	0.093750	19/32 =	
	0.109375	39/64 =	
.,-	0.125000	5/8 =	
	0.140625	41/64 =	
-1	0.156250	21/32 =	
	0.171875	43/64 =	
	0.187500	11/16 =	
,	0.203125		
. ,	0.218750	45/64 =	
,	0.234375	23/32 =	011 101 50
	0.250000	47/64 =	
	0.265625	3/4 =	
	0.281250	49/64 =	
	0.296875	25/32 =	0.781250
-1	0.312500	51/64 =	0.796875
	0.328125	13/16 =	0.812500
	0.343750	53/64 =	0.828125
/	0.359375	27/32 =	0.843750
-1-	0.375000	55/64 =	0.859375
	0.390625	7/8 =	0.875000
	0.406250	57/64 =	0.890625
/	0.421875	29/32 =	0.906250
	0.437500	59/64 =	0.921875
	0.453125	15/16 =	0.937500
/	0.468750	61/64 =	0.953125
	0.484375	31/32 =	0.968750
1/2 =	0.500000	63/64 =	0.984375

Centigrade	Fahrenheit	Centigrade	Fahrenheit
- 18	- 0.4	52	125.6
- 16	3.2	54	129.2
- 14	6.8	56	132.8
- 12	10.4	58	136.4
- 10	14.0	60	140.0
- 8	17.6	62	143.6
- 6	21.2	64	147.2
- 4	24.8	66	150.8
- 2	28.4	68	154.4
.0	32.0	70	158.0
2	35.4	72	161.6
4	39.2	74	165.2
6	42.8	76	168.8
8	46.4	78	172.4
10	50.0	80	176.0
12	53.6	82	179.6
14	57.2	84	183.2
16	60.8	86	186.8
18	64.4	88	190.4
20	68.0	90	194.0
22	71.6	92	197.6
24	75.2	. 94	201.2
26	78.8	96	204.8
28	82.4	98	208.4
30	86.0	**100	212.0
32	89.6	102	215.4
34	93.2	104	219.2
36	96.8	106	222.8
38	100.4	108	226.4
40	104.0	110	230.0
42	107.6	112	233.6
44	111.2	114	237.2
46	114.8	116	240.8
48	118.4	118	244.4
50	122.0	120	248.0

CONVERSION FACTORS

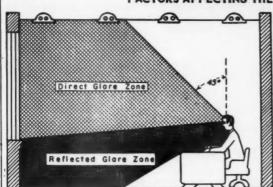
These units	multiplied by	equal	These units	multiplied by	equal
amperes per square cm.	6.452	amperes per sq. inch.	ergs per second	1.341X10 ⁻¹⁰	horse-power.
ampere-turns	1.257	gilberts.		10-10	kilowatts.
ampere-turns per cm.	2.540	ampere-turns per inch.	feet of water	62.43	pounds per square foat.
British thermal units	778.3	foot pounds.		0.4335	pounds per square inch
	3.931X10-4	horse-power-hours.	feet per minute	0.01667	feet per second.
	1055	joules.		0.01136	miles per hour.
	2.930X10-4	kilowatt hours.	feet per second	0.5921	knots.
B.t.v. per min.	12.97	foot-pounds per sec.		0.6818	miles per hour.
	0.02357	horse-power.		0.01136	miles per minute.
	0.01758	kilowatts.	feet per second per second	0.6818	miles per hour per sec.
	17.58	watts	foot-pounds	1.285X10 ⁻³	British thermal units.
B.t.v. per sq. ft. per min.	0,1221	watts per square inch.	1001 pounds	1.356X10'	ergs.
centimeters	3.281X10-1	feet.		5.050X10-7	horse-power-hours.
••••••••	0.3937	inches.		1,356	joules.
	6.214X10-4	miles.		3.766X10-7	kilowatt-hours.
	393.7	mils.	foot-pounds per minute	1.285X10-3	B.t. units per minute.
	1.094X10 ⁻²	yards.	roor-poories per minore	0.01667	foot pounds per second.
centimeter-dynes	7.376X10 ⁻⁶	pound-feet.		3.030X10-5	horse-power,
centimeter-grams	7.233X10 ⁻¹	pound-feet.		2.260X10-1	kilowatts.
centimeters per second	1.969		foot-pounds per second	7.709X10 ⁻²	
centimeters per second	0.03281	feet per minute.	roor-pounds per second		B.t. units per minute.
				1.818X10-3	horse-power.
	0.02237	miles per hour.	**	1.356X10 ⁻³	kilowatts.
	3.728X10 ⁻⁴	miles per minute.	gallons	0.1337	cubic feet.
cms. per sec. per sec.	0.03281	feet per sec. per sec.		231	cubic inches.
circular mils	7.854X10 ⁻⁷	square inches.	gallons per minute	2.228X10 ⁻³	cubic feet per second.
	0.7854	square mils.	gausses	6.452	lines per square inch.
cubic centimeters	3.531X10-5	cubic feet.	gilberts	0.7958	ampere-turns.
	6.102X10 ⁻²	cubic inches.	gilberts per centimeter	2.021	ampere-turns per inch.
cubic feet	1728	cubic inches.	grams	980.7	dynes.
	0.03704	cubic yards.		15.43	grains.
	7.481	gallons.		0.03527	ounces.
	59.84	pints (liq.).		0.03215	ounces (froy).
	29.92	quarts (liq.).		2.205X10-3	pounds.
cubic feet per minute	0.1247	gallons per sec.	horse-power	42.40	B.t. units per min.
	62.4	pounds of water per min.		33,000	foot-pounds per minute.
cubic inches	5.787X10-4	cubic feet.		550	foot-pounds per second.
	2.143X10-5	cubic yards.		1.014	horse-power (metric).
	4.329X10-3	gallons.		0.7457	kilowatts.
	1.061X10 ^s	mil-feet.		745.7	watts.
	0.03463	pints (liq.).	horse-power (boiler)	33.520	B.t.u. per hour.
	0.01732	quarts (lig.).	noise power (somer)	9.804	kilowatts.
cubic meters	35.31	cubic feet.	horse-power-hours	2544	British thermal units.
Conc meleis	61,023	cubic inches.	norse-power-noors	1.98X10*	foot-pounds.
	1.308	cubic yards.		2.684X10*	joules.
	264.2	gallons.		0.7455	kilowatt-hours.
	2113	pints (liq.).	inches	8.333X10 ⁻²	feet.
	1057	quarts (lig.).	inches	1.578X10-5	miles.
1: 1	27	cubic feet.			mils.
cubic yards				103	
	202.0	gallons.		2.778X10 ⁻³	yards.
cubic yards per minute	0.45	cubic feet per second.	inches of water	0.5781	ounces per square inch
	3.367	gallons per second.		5.204	pounds per square foot
degrees (angle)	60	minutes.		0.03613	pounds per square inch.
	0.01745	radians.	joules (Int.)	9.480X10 ⁻⁴	British thermal units.
	3600	seconds.		10'	ergs.
degrees per second	0.01745	radians per second.		0.7378	foot-pounds.
	0.1667	revolutions per minute.		2.778X10-4	watt-hours.
	0.002778	revolutions per second.	kilograms	980,665	dynes.
dynes	2.248X10-+	pounds.		2.205	pounds.
ergs	9.480X10-11	British thermal units.		1.102X10 ⁻³	tons (short).
	1	dyne-centimeters.	kilolines	103	maxwells.
	7.378X10-4	foot-pounds.	kilowatts	56.88	B.t. units per min.
	10-7	joules.		4.427X104	foot-pounds per min.
ergs per second	5.688X10-*	B.t. units per minute.		737.8	foot-pounds per sec.
- Par Jacoba	4.427X10-4	foot-pounds per minute.		1.341	horse-power.
	7.378X10-4	foot-pounds per second.		10'	watts.
		herenge her seconds		1 10	

CONVERSION FACTORS (continued)

These units	multiplied by	equal	These units	multiplied by	equal
kilowatt-hours	3413	British thermal units.	quarts (dry)	67.20	cubic inches.
	2.656X10*	foot-pounds.	quarts (liq.)	3.342X10-2	cubic feet.
	1.341	horse-power-hours.		57.75	cubic inches.
	3.6X10°	joules.	radians	57.30	degrees.
lines per square cm.	1	gausses.		3438	minutes.
lines per square inch	0.1550	gausses.		0.6366	quadrants.
lumens per sq. ft.	1	foot-candles.	radians per second	57.30	degrees per second.
maxwells	10-3	kilolines.		9.549	revolutions per minute.
megalines	10*	maxwells.		0.1592	revolutions per second.
megohms	10*	ohms.	revolutions	360	degrees.
meters	3.281	feet.		4	quadrants.
	39.37	inches.		6.283	radians.
	6.214X10 ⁻⁴	miles.	revolutions per minute	6	degrees per second.
meters per minute	3.281	feet per minute.		0.1047	radians per second.
	0.05468	feet per second.		0.01667	revolutions per second.
	0.03728	miles per hour.	revolutions per second	360	degrees per second.
meters per second	196.8	feet per minute.		6.283	radians per second.
	3.281	feet per second.		60	revs. per minute.
	2.237	miles per hour.	revs. per sec. per sec.	6.283	radians per sec. per sec.
	0.03728	miles per minute.		3600	revs. per min. per min.
microhms	10-12	megohms.		60	revs. per min, per sec.
inci viims	10-6	ohms.	seconds (angle)	4.848X10-+	radians.
miles	5280	feet.	square centimeters	1.973X10 ^s	circular mils.
nine s	6.336X10 ⁴	inches.	square commercia	1.076X10-3	square feet.
miles per hour	88	feet per minute.		0.1550	square inches.
miles per moor	1.467	feet per second.	square feet	2.296X10-1	gcres.
miles per hr. per sec.	1.467	feet per sec. per sec.	square reer	1.833X10°	circular mils.
miles per minute	88	feet per second.		144	square inches.
miles per minute	52.10			1.273X10*	circular mils.
	60	knots.	square inches		square feet.
44	9.425X10 ⁻⁴	miles per hour.		6.944X10 ⁻³	-4
mil-feet	10-3	cubic inches.		10*	square mils.
millihenries		henries.	square meters	2.471X10-4	acres.
millimeters	3.281X10 ⁻³	feet.		10.76	square feet.
	0.03937	inches.		1550	square inches.
	6.214X10 ⁻⁷	miles.		3.861X10-7	square miles.
	39.37	mils.	square miles	640	acres.
mils	8.333X10 ⁻³	feet.		27.88X10*	square feet.
	10-3	inches.		3.098X10*	square yards.
minutes (angle)	2.909X10 ⁻⁴	radians.	square millimeters	1.973X10 ³	circular mils.
ohms	10-	megohms.	square mils	1.273	circular mils.
	106	microhms.		10-4	square inches.
ounces	0.0625	pounds.	square yards	9	square feet.
ounces (troy)	480	grains.		3.228X10-'	square miles.
	0.08333	pounds (troy).	temp. (degs. Cent.)-273	1	abs. temp. (degs. Cent.)
punces per square inch	0.0625	pounds per square inch.	temp. (degs. Cent.) + 17.8	1.8	temp. (degs. Fahr.).
pounds	444,823	dynes.	temp. (degs. Fahr.) +460	1	abs. temp. (degs. Fahr.)
	16	ounces.	temp. (degs. Fahr.) — 32	5/9	temp. (degs. Cent.).
pounds (troy)	0.8229	pounds (av.).	tons (long)	2240	pounds.
pounds-feet squared	144	pounds-inches squared.	tons (metric)	2205	pounds.
pounds-inches squared	6.945X10-2	pounds-feet squared.	tans (short)	2000	pounds.
pounds of water	0.01602	cubic feet.	tons (short) per sq. ft.	13.89	pounds per square inch
	27.68	cubic inches.	tons (short) per sq. in.	2000	pounds per square inch
	0.1198	gallons.	watts	0.05688	B.t. units per min.
pounds of water per min.	2.669X10-4	cubic feet per sec.		10'	ergs per second.
pounds per cubic foot	5.787X10-4	pounds per cubic inch.		44.27	foot-pounds per min.
	5.456X10-9	pounds per mil foot.		0.7378	foot-pounds per secone
pounds per cubic inch	1728	pounds per cubic foot.		1.341X10 ⁻³	horse-power.
p	9.425X10-4	pounds per mil foot.		10-3	kilowatts.
pounds per square foot	0.01602	feet of water.	watt-hours	3.413	British thermal units.
Potential ber adone ton	6.944X10-3	pounds per square inch.		2656	foot-pounds.
pounds per square inch	2.307	feet of water.		1.341X10 ⁻³	horse-power-hours.
position per aquare man	144	pounds per square foot.		10-3	kilowatt-hours.
avadents (goals)	90	degrees.	webers	10*	maxwells.
quadrants (angle)		minutes.		3	feet.
	5400		yards	36	inches.
	1.571	radians.		5.682X10-4	miles.

DESIGN CONSIDERATIONS

FACTORS AFFECTING THE LUMINOUS ENVIRONMENT



- Luminous environment is the resulting visual effect in a lighted space.
- It involves size, shape, and brilliance of the light source; direction and diffusion of the light rays; color, texture and finish of walls, ceiling, floor, furniture, and all other objects in the space; and brightness, glare, contrasts, highlights and shadows.
- For maximum visual comfort and human well-being, light sources should be shielded in the directglare zone and reduced to a minimum in the reflected-glare zone.
- All brightness ratios between visual tasks and surrounding surfaces must be kept to the lowest value possible.

EFFECT OF LIGHTING LOAD ON AIR CONDITIONING

- Heat produced by lighting load (measured in Btu per hr) = kilowatts * x 3.413
 (* Includes total power consumed: Lamp watts plus ballast watts loss)
- Tons of air conditioning required to remove a lighting system heat load = Btu per his
- One ton of air conditioning will remove the heat produced by a lighting load of 3500 watts.

HOW TO SELECT LUMINAIRES

Type of Light Source

Consider lumens per watt, size of lamps, color quality of light produced by the lamps, lamp life and replacement cost.

Type of Light Distribution

The type of lighting system and equipment layout selected will control the type of light distribution required for the luminaires or reflector equipment.

Initial Lumens Required

Light loss factors, spacing of outlets, and the desired lighting intensity maintained in service will establish light output in lumens required for each luminaire.

Overall Efficiency

Overall efficiency of luminaires varies from a high of approximately 90% downward. Consult manufacturers' light output and photometric data for luminaires under consideration.

Quality of Materials

Reflectors should have permanent type reflecting surface. Diffusing media should be durable, highly translucent, and should present an evenly lighted appearance. Gauge of metals should be adequate for necessary rigidity. Proper ventilation is important.

Ease of Maintenance

Luminaires should be easy to clean and relamp, with easily removable louvers, panels, etc. Ballasts should be readily accessible.

Appearance

Luminaires should present a good appearance and harmonize with interior and architectural treatment where used. Plain, simple lines are usually preferred.

Cost

Equipment cost is only part of the cost of good lighting. High first cost of equipment in a well designed lighting system may readily provide low cost lighting. Consider operating amd maintenance costs; then select a low-cost "system".

LIGHTING SYSTEM VOLTAGES

Incandescent Filament Lamps	Electric Discharge Lamps	High Frequency Systems	
28-32	110-125	400*	
110-125	220-240	600*	
220-240	240-280		

^{*}Phase-to-phase voltage, with grounded neutral to provide less than 300 volts to ground.

LIGHTING CALCULATIONS METHODS

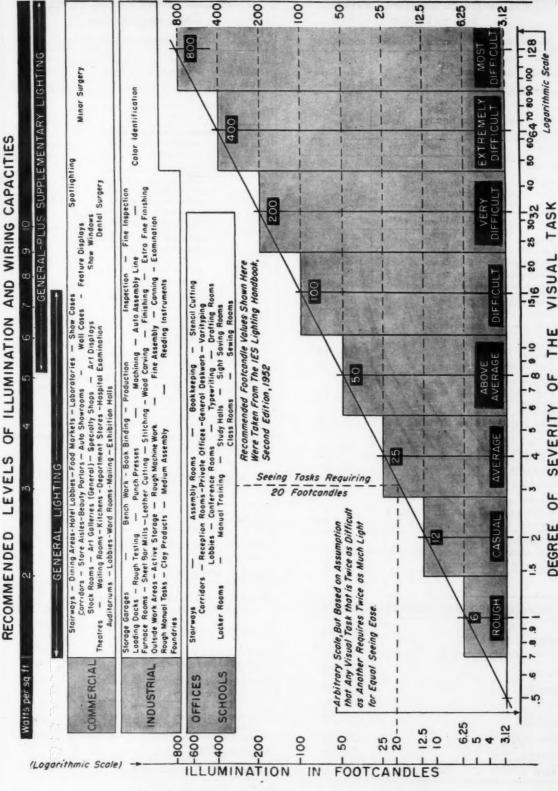
Type Lighting	Method of Calculation		
General	Lumen Method		
	Interflectance Method		
	Zonal Lumen Method		
	Point-by-Point Method		
Supplementary	Point-by-Point Method		
	Lumens-per-Foot Method		
Floodlighting	Beam Lumens Method		
	Point-by-Point Method		
Street	Isocandle Curves		

LAYOUT REMINDERS

For the Lighting System Designer

- A customer buys a lighting system to provide an adequate, comfortable and appropriate lighting result -- not because he wants luminaires, lamps, conduit and wiring.
- Luminaires and lighting equipment selected should be appropriate for the structure and the seeing problems involved. Appearance, functional design, direct and reflected glare, shadows, maintenance, and lighting efficiency are all factors to be considered.
- The lighting layout should fit the structural details of the building. If plans and drawings are not available, survey the interior and note location of columns, beams, obstructions and other architectural features.
- Use conventional layouts with symmetrical spacing of units, if possible, with luminaires parallel and perpendicular to walls. Special geometrical patterns may be suitable in some cases but should be avoided generally unless they serve a specific functional or design purpose.
- Use continuous-row fluorescent luminaires in preference to individual units. The completed installation will look better and usually results in economies in wiring and installation.
- Recessed and built-in lighting equipment does not light the ceiling. Check your layout and room surface reflectances to see that use of such equipment will not produce uncomfortably dark ceilings nor excessive brightness ratios in the normal field of view.

- Efficiency of trans-lighted ceilings is dependent to a great extent on the reflectance of the plenum cavity. Be sure lamps can be mounted sufficiently high above diffusers or lovers to provide uniform brightness and spaced properly to provide desired intensity. Paint entire cavity white with highest possible reflectance.
- Suspended luminaires of the direct-indirect type often produce the best lighting result most economically. Check the suspension length carefully and limit it to the dimension which gives reasonably uniform ceiling brightness.
- Luminaire spacings should be used which produce uniform illumination and prevent undesirable shadows.
- Flexible lighting layouts which will permit more luminaires or lamps to be added later should be planned. This will permit an increase in lighting intensity without spoiling the symmetry or architectural harmony of the initial installation.
- Plan the maintenance program along with the lighting layout. Be sure that all luminaires and lighting equipment are easily accessible and are designed to be cleaned easily and quickly.
- Consider the finish and reflection factor of ceiling and side walls. Recommend proper colors and finishes to provide surrounding brightness conditions which promote eye comfort and good seeing conditions.
- Double check all calculations and details to insure the proper number of units and the ultimate desired lighting result.



RECOMMENDED LIGHTING LEVELS FOR THE HOME

(Minimum illumination for household activities)

Activity (Seeing Task)	Intensity on Task (Footcandles)
Reading Prolonged periods; fine type. Casual periods; books; magazines	40 – 50 20 – 30
Studying	40 – 50
Writing or Typewriting	25 – 40
Game Playing Cards, general games Table tennis, recreational	10 - 20 20 - 50
Drafting (or other detail work)	50 - 100
Sewing Casual, on light goods Prolonged, on light goods Prolonged, average sewing Fine needlework, on dark goods	20 - 30 30 - 50 50 - 100 Over 100
Kitchen Work General Sink, range, food preparation area	10 - 20 40 - 50
Dining General If table used for reading or writing	5 – 10 40 – 50
Laundry Tubs, ironing board, ironer	40 – 50
Make-Up Dressing tables and dressers	20 – 30
Shaving Bathroom mirror	30 – 40
Handicrafts (Knitting, Weaving, etc.)	20-30
Bench Work	30 – 50
General Lighting Walking up and down stairs; halls General circulation in rooms	4 - 8 5 - 10

Night Lights
Wall recessed, 7½ watts. Burn continuously;
locate at all danger spots.

RECOMMENDED INTERIOR REFLECTANCES Reflectance Surface Range (%) 75 - 90Ceiling 50 - 65Upper Walls Trim 40 - 5030 - 40Machines Lower Walls 30 - 5025 - 40**Furniture** Floors 15 - 30

RECOMMENDED LIGHTING LEVELS FOR PRODUCTION

(Maintained in service)*

Activity (Seeing Task)	(Seeing Examples of Work	
Rough	Inactive storage; corridors	(3 – 10)
Casual	Active storage; service areas; stairways; aisles; washrooms	10 (8 - 20)
Average	Moderately fine detail with normal contrasts; intermittent seeing; automatic machine operations; rough grad- ing; packing and shipping	30 (20 – 40)
Above Average	Prolonged work involving moderate contrasts. Ordinary assembly; bench work; machine shop operations	50 (40 – 75)
Difficult	Precision work involving fine detail; fair con- trasts over long periods. Fine assembly; high- speed work	100 (70 – 150)
Very Difficult	Precision work involving finest detail; poor con- trasts over long periods. Extra-fine assembly; precision grinding; extra-fine finishing	200 up

^{*} Based on Illuminating Engineering Society's "American Recommended Practice on Industrial Lighting."

RECOMMENDED BRIGHTNESS RATIOS FOR INTERIOR LIGHTING

Condition	Ratio
Condition	Kano
Between visual tasks and adjacent surroundings	1 to 1/3
Example: White paper and desk top	
Between visual tasks and more re- mote darker surfaces	1 to 1/10
Example: White paper on desk & floor	
Between visual tasks and more re- mote brighter surfaces	1 to 10
Example: White paper on desk and luminaires	
Between luminaires and adjacent surfaces in normal field of view	20 to 1
Anywhere within normal field of view	
Example: Luminaires and floor	40 to 1

ROOM RATIOS

Roo	m	He	ight of	Lumina	ire abo	ve Floor	1	
W	L	8	10	12	15	19	27	43
ft	ft							
	10	0.9	0.7	0.5			Wx	L
	14	1.1	0.8	0.6	0.5	RR =	H (W -	+ 1)
10	18	1.2	0.9	0.7	0.5		(,
	24	1.3	0.9	0.7	0.6			
	30	1.4	1.0	0.8	0.6			
	14	1.3	0.9	0.7	0.6			
	20	1.5	1.1	0.9	0.7	0.5		
14	30	1.7	1.3	1.0	0.8	0.6		
	40	1.9	1.4	1.1	8.0	0.6		
	60	2.1	1.5	1.2	0.9	0.7	0.5	
	00	17	1.0	10	0.0	0.4		
	20	1.7	1.3	1.0	0.8	0.6		
***	30	2.0	1.5	1.2	0.9	0.7	0.5	
18	40	2.3	1.6	1.3	1.0			
	60	2.5	1.8	1.4	1.1	0.8	0.6	
	80	2.7	2.0	1.5	1.2	0.9	0.6	
	30	2.5	1.8	1.4	1.1	0.8	0.6	
	40	2.8	2.1	1.6	1.2	0.9	0.6	
25	60	3.2	2.4	1.9	1.4	1.1	0.7	
	80	3.5	2.5	2.0	1.5	1.2	0.8	0.
	40	3.6	2.7	2.1	1.6	1.2	0.8	0.
	60	4.4	3.2	2.5	1.5	1.5	1.0	0.
40	80	4.9	3.6	2.8	2.1	1.6	1.1	0.
	100	5.2	3.8	3.0	2.3	1.7	1.2	0.
	60	5.5	4.0	3.2	2.4	1.8	1.2	0.
60	100	6.8	5.0	3.9	3.0	2.3	1.5	0.
	140	7.6	5.6	4.4	3.4	2.6	1.7	1.
80	80	7.3	5.3	4.2	3.2	2.4	1.6	1.
80	140		6.8	5.4	4.1	3.1	2.1	1.
	200		7.6	6.0	4.6	3.5	2.3	1.
	100		6.7	5.3	4.0	3.0	2.0	1
100	150			6.3	4.8	3.6	2.5	1
	200			7.0	5.3	4.0	2.7	1
	120			6.3	4.8	3.6	2.5	1
120	160			7.2	5.5	4.2	2.8	1
	200				6.0	4.5	3.1	1

^{*}In calculating Room Ratios, H = distance from Luminaire to work plane (30 in.).

Note: This table may be used only with luminaires of types D, SD or G; for other types see formula in chart at left.

Direct, Semi-Direct and General Diffuse Lighting:

			W×L		
Room	Ratio=				-
	1	Mounting height	above work	plane v (W+	11

Semi-Indirect and Indirect Lighting:

W=width of room

L=length of room

Average Room Ratio	Range of Room Ratios	Room Index
5.0	4.5 up	A
4.0	3.5 to 4.5	В
3.0	2.75 to 3.5	С
2.5	2.25 to 2.75	D
2.0	1.75 to 2.25	E
1.5	1.38 to 1.75	F
1.25	1.12 to 1.38	G
1.00	0.9 to 1.12	Н
0.8	0.7 to 0.9	1
0.6	Less than 0.7	J

ROOM INDEXES

Room Width	Room Length		DIRECT,	SEMI-DIREC Mountin	CT AND GE			LIGHTING	;
(feet)	(feet)	8	9	10	12	15	19	27	43
	10	Н	1	J	J				1
	14	Н	Н	1	J	J			
10	18	G	Н	1	J	J			1
10	24	G	G	Н	1	J			
	30	F	G	Н	1	J	J		
	12	G	Н	1	J	J			
	16	G	Н	1	1	J			
12	20	F	G	Н	1	J	J		1
	30	F	F	G	Н	J	J		
	14	F	G	Н	1	J			
	18	F	G	Н	1	J	J		
14	24	F	F	G	н	J	J		
	30	E	F	G	Н	1	J		
	40	E	F	F	H	1	J	J	
	16	F	G	G	1	J	J		
	20	F	F	G	Н	1	J		
16	30	E	F	F	Н	!	j		
	40	E	F		G	1	J	J	
	20	E	E	F	Н	1	j		
20	30 40	D D	E	F	G F	Н	J	J.	
20	60	D	D	E	F	H		J	
	24	D	E	F	G	Н	-	j	
	30	D	E	E	F	н	i	j	
24	40	c	D	E	F	G	i	j	
	60	c	D	D	E	F	н	Ĵ	
	80	C	D	D	E	F	G	Ĵ	J
	30	00000	D	E	F	G	Н	J	-
	40	С	D	D	E	F	Н	i	
30	60	C	C	D	E	F	G	i	J
	80		C	C	E	F	G	1	J
	40	В	С	С	E	F	G		J
	60	В	В	C	D	E	F	Н	J
40	80	В	В	C	D	E	F	Н	J
	100	В	В	С	С	E	F	G	J
	60	A	A	В	С	D	E	G	
	80	A	A	A	В	D	E	F	
60	100	A	A	A	В	C	E	F	1
	120 80	A	A	A	B	С	D	F	Н
00		A	A	A	- 1	0	D	F	Н
80	140	A	A	A	A	В	C	E	G
	200 100	A	A	A	A	В	С	E	F
100	150	Â	A	A	A	В	C	E	G
100	200	Ä	A	A	A	B B	CC	D D	F
	120	A	A	A	A	A	В	D	F
120	160		A	A	Â	Â	В	D	F
	200	A	A	A	Â	Â			F
Room	Room	101/2	12	131/2	161/2	21	B 27	<u>C</u> 39	63
Width (feet)	Length (feet)			EMI-INDIRE		NDIRECT	LIGHTING		-

NOTE: For more complete table, see Table 9-1, IES Lighting Handbook, 2nd Edition.

FORMULAS FOR GENERAL LIGHTING DESIGN

Lumen Method of Calculation

Average lumens reaching work plane = total initial lamp lumens × CU × MF

Average footcandles at work plane = total initial lamp lumens × CU × MF area of room in sq ft

= total watts per sq ft \times overall lumens per watt \times CU \times MF

Area per lamp (sq ft) = $\frac{\text{initial lumens per lamp} \times \text{CU} \times \text{MF}}{\text{average footcandle level desired}}$

Area per luminaire (sq ft) = $\frac{\text{initial lumens per lamp} \times \text{no. of lamps per luminaire} \times \text{CU} \times \text{MF}}{\text{average footcandle level desired}}$

Total watts per sq ft = $\frac{\text{average footcandle level desired}}{\text{overall lumens per watt} \times \text{CU} \times \text{MF}}$

CU = Coefficient of Utilization

MF = Maintenance Factor

Point-by-Point Method of Calculation

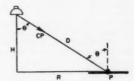
Illumination Normal to Light Ray:

$$E_n = \frac{CP}{D^n}$$

H CP O

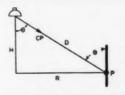
Horizontal Illumination:

$$E_h = \frac{CP}{D^2} Cos \theta = \frac{CP}{H^2} Cos^3 \theta = \frac{CP \times H}{D^3}$$



Vertical Illumination:

$$E_v = \frac{CP}{D^2} \sin \theta = \frac{CP}{H^2} \cos^2 \theta \sin \theta = \frac{CP \times R}{D^3}$$



En = Illumination on plane normal to light ray (footcandles)

 $E_{\rm b}$ = Illumination on horizontal plane when light ray hits plane at angle θ (footcandles)

 $E_{\rm v}$ = Illumination on vertical plane when light ray hits plane at angle θ (footcandles)

CP = Intensity of light source in direction of point P (candlepower)

D = Distance from light source to point P (feet)

H = Vertical mounting height of light source above plane of measurement (feet)

R = Horizontal distance from light source to point P (feet)

 Angle between light ray and a perpendicular line through light source (or a line perpendicular to horizontal plane through point P)

LUMINAIRE MOUNTING AND SPACING COMMERCIAL

INDUSTRIAL

	Direct	36	mi-Direct	Semi-India	eci	indirect	spread	Conce	intrating
Mounting Height of Luminaire Ceiling Height for Indirect and Semi- Indirect Luminaires		\$ {	SD	SI					
Dimensions in Feet	Usual Spacing Between Units	Max. Spacing Between Units	Spacing* from Walls	Spacing Between Units	Spacing* from Walls	Length of Suspension	Maximum	Spacing	(ft.)
8	7	71/2	3	9	3	1-3	Mounting Heights		Between
9	8	8	3	91/2	3	11/2-3	Above Floor		Concen't.
19	9	9	31/2	101/2	31/2	2.2	15	12	-
11	10	101/2	31/2	12	31/2	2-3	16	12	-
12	10-12	12	4	14	4	21/2-4	18	18	_
13	10-12	13	4	15	4		20	20	-
14	10-13	15	5	17	5	3-4	22	20	-
15	10-13	17	5	19	5		24	23	16
16	10-13	19	6	21	6	4-5	26	25	17
18	10-20	21	6	23	6	4-3	28	30	18
20 or more	18-24	24	7	26	7	4-6	30 or more	30	20

*Spacings apply where desks ar benches are next to wall, otherwise one-half the spacing between units is satisfactory.

*Units may have to be spaced closer to obtain desired illumination values.

*Where benches or machines are next to wall, spacing from wall should not exceed 1/3 spacing between units. Otherwise 1/2 unit spacing is suitable.

LIGHTING SYSTEM CLASSIFICATIONS

	Type D	Type SD	Type G	Type SI	Type I
	0-10%	10-40%	40-60%	60-90%	90-100%
UP				XX	
L					
NWN	90-100%	60-90%	40-60%	10-40%	0-10%
	Direct	Semi-Direct	General Diffuse	Semi-Indirect	Indirect

LIGHTING DESIGN AND LAYOUT DATA (continued)

Coefficients of Utilization for Typical Lighting Systems

CU values given are average for only three room indexes: B (room ratio 3.0 up); E (room ratio 1.25 to 3.0); and H (room ratio 1.25 and less). Interpolate for intermediate values, or see manufacturers' complete CU data for specific luminaires when greater accuracy is required.

Type of Lighting	Ceiling RF	75%	50%
	Wall RF	50%	30%
Fluorescent Troffer Lighting; low values represent recessed troffers equipped with diffusing glass covers; high values represent open	Room Index	Approx.	Range
	A	0.51 to 0.68	0.48 to 0.64
	В		0.47 to 0.62
	С	0.49 to 0.66	0.46 to 0.61
single-lamp troffers	D	0.47 to 0.65	0.45 to 0.59
	E	0.44 to 0.60	0.42 to 0.57
	F	0.42 to 0.58	0.53
	G	0.39 to 0.55	0.37 to 0.51
	Н	0.37 to 0.52	0.34 to 0.48
	1	0.34 to 0.48	0.44
2	J	0.28 to 0.40	0.24 to

*RF = R	eflectance	Factor
---------	------------	--------

Type of Lighting	Ceiling RF	75% 50%	50% 30%	
	Wall KF	30%	30%	
Industrial Reflectors; med-	В	0.63	0.60	
ium bay, for incandescent	E	0.55	0.51	
or mercury vapor lamps	Н	0.45	0.41	
Industrial Luminaires; flu-	В	0.72	0.68	
orescent, 2-lamp, open-	E	0.62	0.58	
or closed-end, without louvers	H.	0.50	0.46	
Recessed Reflector				
Lamps; 150-watt R40	В	0.51	0.49	
flood, with 15° shielding.	E	0.48	0.45	
(CU varies greatly with de- gree and type of shielding.)	н	0.41	0.38	
Cove Lighting; average				
conditions and good re-	В		0.21	
lationship of cove to	E		0.15	
ceiling. Increase values for good conditions; de- crease for poor conditions	н	0.17	0.09	
Coffer Lighting; good white	В		0.16	
reflecting surface with	E	0.19	0.12	
mat finish in coffer	Н	0.12	0.07	

TRANS-LIGHTED CEILINGS												
	Me	ielding tal vers	45° Shi Pla: Lou	stic	Lens F Pat. 70		Alba- Glass		Corrug		Pla Pan	
Room	Wall	RF	Wall	RF								
Ratio Ratio	50%	30%	50%	30%	50%	30%	50%	30%	50%	30%	50%	30%
0.6 0.8 1.0 1.25 1.5 2.0 2.5 3.0 4.0 5.0	.24 .28 .31 .33 .35 .37 .39 .41 .43	.21 .25 .28 .30 .32 .34 .36 .38 .40	.25 .29 .32 .35 .38 .41 .43 .45 .47	.20 .25 .28 .32 .34 .38 .40 .42 .44	.31 .36 .41 .45 .48 .51 .54 .56 .57	.26 .33 .38 .41 .45 .49 .51 .52 .55	.28 .33 .38 .42 .45 .48 .51 .54 .55	.23 .30 .35 .38 .42 .46 .49 .50 .53	.22 .27 .33 .38 .41 .46 .49 .52 .55	.16 .22 .28 .32 .37 .42 .46 .49 .52	.23 .28 .34 .39 .42 .47 .50 .53 .56	.16 .23 .29 .33 .38 .43 .47 .50

Plenum cavity reflectance of at least 75% and of sufficient depth to provide reasonable brightness uniformity on the diffusing medium.

COEFFICIENTS OF UTILIZATION FOR FIVE GENERAL TYPES OF LUMINAIRES

LUMINAIRE	Ceiling	80	0%	50	1%	70%		
	Walls	50%	30%	50%	30%	50%	30%	
	Floor	10%		10%		30%		
	Room Ratio							
INDIRECT	0.6 0.8 1.0 1.25 1.5 2.0 2.5 3.0 4.0 5.0	.27 .34 .39 .45 .49 .55 .58 .61	.21 .28 .33 .39 .43 .49 .53 .56 .61	.17 .22 .26 .30 .32 .36 .38 .40 .43	.14 .18 .22 .26 .28 .32 .35 .37 .40	.25 .32 .37 .42 .47 .53 .57 .60	.20 .26 .31 .36 .40 .46 .51 .54	
SEMI-INDIRECT	0.6 0.8 1.0 1.25 1.5 2.0 2.5 3.0 4.0 5.0	.24 .30 .35 .40 .44 .49 .52 .55 .58	.19 .25 .30 .35 .38 .44 .48 .50 .54	.17 .22 .26 .29 .32 .36 .38 .40 .43	.14 .18 .22 .26 .28 .32 .35 .37 .40	.22 .28 .33 .38 .43 .48 .52 .55 .59	.18 .23 .28 .33 .37 .43 .47 .50 .54	
GENERAL DIFFUSING	0.6 0.8 1.0 1.25 1.5 2.0 2.5 3.0 4.0 5.0	.26 .32 .38 .43 .47 .53 .56 .59 .62	.21 .27 .33 .38 .42 .48 .52 .55 .59	.23 .28 .33 .37 .40 .44 .47 .49 .52	.19 .24 .29 .33 .36 .41 .44 .46 .49	.26 .32 .38 .43 .48 .54 .58 .61 .65	.21 .27 .32 .38 .42 .48 .53 .55 .61	
SEMI-DIRECT	0.6 0.8 1.0 1.25 1.5 2.0 2.5 3.0 4.0 5.0	.34 .42 .48 .54 .58 .64 .67 .70 .73	.28 .36 .42 .48 .53 .59 .63 .66 .70	.31 .38 .44 .49 .53 .58 .60 .63 .66	.26 .33 .39 .45 .49 .54 .57 .60 .63	.34 .42 .48 .55 .60 .66 .71 .74 .78	.28 .36 .42 .49 .54 .61 .65 .68 .75	
DIRECT	0.6 0.8 1.0 1.25 1.5 2.0 2.5 3.0 4.0 5.0	.34 .43 .49 .55 .60 .65 .69 .72 .76	.28 .36 .42 .49 .54 .60 .64 .67 .72	.33 .41 .47 .53 .57 .63 .66 .69 .73	.27 .35 .42 .48 .52 .59 .63 .66 .70	.35 .44 .50 .57 .62 .69 .74 .78 .83	.28 .36 .42 .50 .55 .63 .68 .72 .78	

LIGHTING DESIGN AND LAYOUT DATA (continued)

LOAD AND LIGHT OUTPUT OF TYPICAL FLUORESCENT LUMINAIRES*

Fluorescent Lamps			1-Lo	1-Lamp Luminaire			2-Lamp Luminaire**		
Type Lamp	Length Inches	Lamp Watts	Lamp Current (ma)	Lumens	Total Watts	L/W	Lumens	Total Watts	L/W
40T12	48	39	430	2450	48	51.0	4900	94	52.1
40T12/RS	48	39	430	2450	51	48.0	4900	95	51.5
40T17/IS	60	41	425	2400	61	39.4	4800	104•	46.2
90T17	60	89	1570	4950	114	43.4	9900	216	45.9
72T8	72	25	120	1720	36	48.8	3440	69	49.9
72T8	72	37	200	2550	53	48.2	5100	98	52.1
72T8	72	49	300	3300	70	47.2	6600	134	49.2
92T8	96	32	120	2350	43	54.6	4700	85	55.3
96T8	96	49	200	3500	69	50.7	7000	130	53.9
96T8	96	65	300	4550	90	50.5	9100	176	51.6
48T12	48	38	425	2250	58	38.8	4500	104	43.2
48T12	48	38	425				4500	98●	45.9
72T12	72	55	425	3550	80	44.4	7100	143	49.7
72T12	72	55	425				7100	138•	51.4
96T12	96	74	425	4950	101	49.0	9900	193	51.3
96T12	96	74	425				9900	176•	56.3
96T12/RS	96	110	800				13600	623	51.7

^{*}Using HPF lead-lag ballast and standard cool white lamps. For lumen output using other color lamps, use the multiplying factors given in table. "Fluorescent Lamp Lumen Output Ratios".

Source: Computed from data in General Electric Co. Bulletin LA-101, March 54.

^{**}For total lumens and watts for 3-lamp luminaires, add values of 1-lamp luminaires to those for 2-lamp luminaires. For 4-lamp luminaires, double the values of 2-lamp luminaires.

Based on use of 2-lamp series ballasts.

Average Light Output and Operating Life for Typical Light Sources

INCANDESCENT LAMPS

Lamp Designation	Rated Life (Hours)	Initial Output (Lumens)	Mean Output (Lumens)	Per BLH*
100-watt A21	750	1,630	-	-
150-watt A23	750	2,700	_	-
200-watt A25	750	3,700	3,500	381
300-watt PS35	1,000	5,650	5,100	196
500-watt PS40*	1,000	11,200	10,200	98
750-watt PS52*	1,000	17,100	15,800	63
1000-watt PS52*	1,000	23,400	21,300	47
500-watt R52	2,000	7,500	6,900	73
750-watt R52	2,000	12,500	10,000	50

^{*}Coiled-coil filament axially mounted.

FLUORESCENT LAMPS

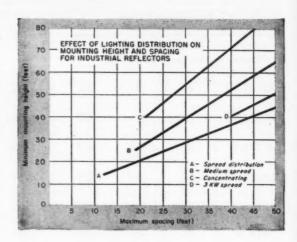
Lamp Designation	Rated Life (Hours)*	Initial Output (Lumens)	Mean** Output (Lumens)	Per BLH*
F40T12/CW	7,500	2,500	2,150	62
F40T12/D	7,500	2,300	2,000	67
F90T17/CW	7,500	5,150	4,250	31
F90T17/D	7,500	4,800	4,000	33
F48T12/CW/RS (800 ma)	7,500	3,100	-	-
F72T12/CW/RS (800 ma)	7,500	4,800	-	-
F96T12/CW/RS (800 ma)	7,500	7,250	6,150	22
F48T12/CW Slimline	7,500	2,300	2,000	67
F96T12/CW Slimline	7,500	5,050	4,500	30

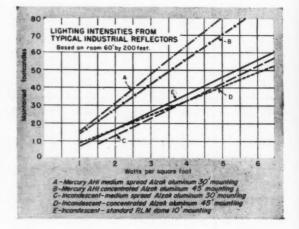
^{*}Based on 3 burning hours per start.

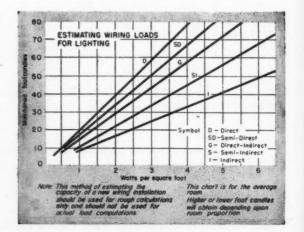
MERCURY VAPOR LAMPS

Lamp Designation	Rated Life* (Hours)	Output (Lumens)	Mean Output (Lumens)	Per BLH *
H250A5	6,000	11,000	8,900	18.7
H400E1	6,000**	21,000	16,400	10.2
H400J1	6,000**	20,000	15,600	11.7
H400R1	6,000**	18,000	14,900	11.2
H400RC1	6,000**	20,500	17,000	9.8
H1000A15	6,000	54,000	35,100	4.8
H3000A9	6,000	132,000	103,000	1.6

^{*}Rated life data shown are averages from tests of lamps burning five hours per start in appropriate industrial type reflectors.







^{**}Approximate mean output at 40% life.

^{**}Designates economic life of the lamp under typical average operating

^{*}Average lamp burnouts per billion tumen hours (calculated).

LAMP SPECIFICATIONS

RATED AVERAGE LIFE OF FLUORESCE

Type Lamps	Burning Hours Per Start						
	3	6	12	Continuous*			
Starter-Operated (15-, 20-, 25-, 30-, 32-, 40-, 90-, and 100-watt)	7500						
Rapid Start	7500	Plus 25%	Plus 60%	Plus 250%			
All T-12 Slimline	7500						
T-6 and T-8 Slimline	6000						
Cold Cathode LP Cold Cathode HP	15000 25000	Life not affected by number of starts					

*Light output depreciates steadily as lamps are burned. Where infrequent starting or continuous burning is involved, lamps should be replaced before they reach average life for greatest lighting value.

FLUORESCENT LAMP LUMEN OUTPUT RATIOS

(Standard Cool White = 1.00)

(Standard Cool White = 1.00)					
Color of Lamp	Multiplying Factor				
Deluxe Cool White	0.71				
Deluxe Warm White	0.71				
Daylight	0.93				
Soft White	0.68				
Green	1.20				
Gold	0.60				
Blue or Pink	0.45				
Red	0.06				

FLUORESCENT LAMPS AND BALLASTS

Number and Type	Weight	Line	Watts	Consumed	Lumens	Lumens
of Lamps	(lbs)	Current (amps)	Ballast Per Lamp*		per Lamp	per Watt**
	FO	R 60 CYCLE, 11	0-125-VOLT (CIRCUITS		
2 - 20	3.4	.42	9	24.5	1000	40.8
2 - 30	6.2	.70	18	39.0	1890	48.5
2 - 40	5.5	.85	16	48.0	2500	52.1
2 - 40T17IS	9.5	.95	30	55.0	2500	45.4
2 - 48T12	9.5	.95	30	53.0	2300	43.4
2 - 72T12	13.8	1.60	34	72.0	3600	50.0
2 - 96T12	13.8	1.60	34	91.0	5050	55.4
2 - 48T12RS	4.0	.85	12	46.0	2500	54.4
2 - 48T12RS/800	10.0	1.30	30	75.0	3100	41.4
2 - 72T12RS/800	14.0	1.70	30	100.0	4800	48.0
2 - 96T12RS/800	14.0	2.00	20	115.0	7250	63.0
2 - 90117	10.0	1.00	21	100.5	5150	51.2
	FO	R 60 CYCLE, 22	0-250-VOLT	CIRCUITS		
2 - 40	5.7	.45	18	49.0	2500	51.0
2 - 90T17	14.3	.93	31	105.5	5150	48.8
2 - 48T12RS	5.5	.43	13	46.5	2500	53.8
	FC	R 60 CYCLE, 24	10-280-VOLT	CIRCUITS		
2 - 40	5.3	.37	18	49.0	2500	51.0
2 - 48T12	10.0	.43	28	52.0	2300	49.2
2 - 72T12	9.5	.74	30	70.0	3600	51.4
2 - 96T12	9.5	.74	30	89.0	5050	56.8
2 - 48T12RS	4.0	.39	12	46.0	2500	54.3
3 - 48T12RS	11.0	.55	18	46.0	2500	54.3
2 - 96T12RS/800	14.0	.88	20	115.0	7250	63.0
2 - 90T17	14.3	.83	31	105.5	5150	48.7
4 - 90T17	16.5	1.65	36	99.0	5150	52.0

^{*}Includes lamp wattage plus watts loss in ballast.

^{**}Overall efficiency, including ballast watts loss.

LIGHTING DESIGN AND LAYOUT DATA (continued)

LAMP SPECIFICATIONS

	STANDAR	D FLU	DRESCE	NT LA	MPS	
Lamp Desig-	Nominal Length	Ave.	Standard White		Standard War White and Whi	
nation	(Inches)	Amps.	Lumens	L/W	Lumens	L/W
	Ge	neral L	ine Lam	os*		
F4T5	6	0.125	100	25.0	105	26.2
F6T5	9	0.145	210	34.4	220	36.1
F8T5	12	0.16	320	40.5	330	41.8
F13T5	21	0.16	680	52.3	700	53.8
F14T12	15	0.39	540	38.4	570	40.7
F15T8	18	0.30	730	48.6	760	50.6
F15T12	18	0.33	615	43.6	640	45.4
F20T12	24	0.37	980	51.0	1000	52.1
F25T12	33	0.52	1470	60.0	1530	63.4
F30T8	36	0.355	1840	61.4	1900	62.0
F40T12	48	0.43	2500	64.1	2600	66.6
F90T17	60	1.57	5150	57.8	5300	59.5
	R	opid Sta	rt Lamps			
F40T12/RS	48	0.43	2500	64.1	2600	66.6
F48T12/RS	48	0.800	3100	52		
F72T12/RS	72	0.800	4800	56		
F96T12/RS	96	0.800	6800	61.8		
F40T/IS	48	0.43	2500		T 2600	1 44 4
F40T17/IS	60	0.43	2400	64.1 58.5		66.6
	neral Elec					
NOTEDa						tinent
infe	ormation f	or ligh	ting app	licatio	n design	only.
For	more con	mplete	data, see	e lamp	manufact	urers'
	prescent le					

CI	RCLINE FL	UORESCE	NT LAN	APS	
Lamp	Lamp Size	Nominal	Ave.	Lumens	
Designation	Dia. (In.)		Lamp	Cool White	Warm
FC8T9	8 1/4	22	0.390	930	
FC12T10	12	32	0.435	1550	1600
FC16T10/RS*	16	40	0.420	2200	

*Designed for Rapid Start operation. For more detailed information, see mfgrs' catalogs.

For operation in pre-heat ballast circuits.

Lamp	Lamp	Lumens	Watts Per Linear Foot			
Diameter (mm)	Current Per (ma) Foot*	LP Lamps	HP Lamps			
	30	140	3.0	3.3		
15 (T-5)	60	240	5.1	5.6		
	100	380	8.2	8.9		
	60	220	4.5	4.9		
20 (T-6½)	100	330	6.4	7.0		
(,	120	390	7.2	7.8		
	150	470	9.6	10.5		
	60	170	3.2	3.4		
	100	270	4.6	5.1		
25 (T-8)	120	310	5.2	5.7		
20 (1-0)	150	380	6.9	7.5		
	200	500	9.2	10.0		

Source: Fluorescent Lighting Association Handbook.
Cold Cathode lamps can be custom made to meet a wide
range of special lighting conditions, including special
lengths and curved sections.

*Lumen values are for warm white lamps.

SL	IMLINE F	LUORES	CENT L	AMPS	
Lamp Designation	Ave. Lamp	Stand Cool 1		Standard Warm White and White	
	Watts*	Lumens	L/W*	Lumens	
0,	perated at	120 ma L	amp Cu	rent	
F42T6	17.5	1030	59.8	1100	62.9
F64T6	25.5	1640	64.3	1710	67.1
F72T8	24.5	1720	70.2	1790	73.0
F96T8	32.0	2350	73.3	2450	76.4
0	perated a	t 200 ma L	amp C	urrent	
F42T6	25.0	1480	59.2	1570	62.8
F64T6	37.0	2350	63.5	2450	66.2
F72T8	36.5	2550	69.8	2650	72.5
F96T8	49.0	3500	71.4	3600	73.5
0	perated a	t 300 ma l	amp C	urrent	
F42T6	32.5	1790	55.1	1900	58.4
F64T6	48.0	2850	59.4	2950	61.5
F72T8	48.5	3300	68.0	3400	70.0
F96T8	65.0	4550	70.0	4650	71.5
0	perated a	t 425 ma l	amp C	urrent	
F48T12	38.0	2300	60.5	2400	63.1
F72T12	55.0	3600	65.4	3700	67.2
F96T12	74.0	5000	67.6	5150	69.6

Source: General Electric Co., Lamp Department
NOTE—Data in this Table are condensed, giving pertinent information for lighting application design only. For more complete data, see manufacturers' fluorescent lamp catalogs and bulletins.
*Lamp Wattage only, and lamp lumens per watt. For overall wattage, add ballast watts loss.

Lamp	Nominal	Lamp			umens	
Desig- nation	Length (in.)	Wattage*	Warm White	L/W*	4500° White	L/W*
	20 mm L	amps Ope	rated a	t 120 m	a**	
2045	48	31	1250	40.5	1150	37.1
2052	-55	32	1600	50.0	1450	45.3
2064	67	35	1450	41.4	1350	38.5
2069	72	37	1550	41.9	1450	39.2
2072	75	38	1600	42.1	1500	39.5
2084	87	42	2250	53.5	2150	51.2
2093	96	45	2500	55.5	2400	53.3
	25 mm l	amps Ope	erated a	t 120 n	10**	
2545	48	26	1 100	42.3	1000	38.5
2552	55	29	1250	43.1	1150	39.7
2564	67	31	1350	43.6	1250	40.2
2569	72	34	1700	50.0	1600	47.0
2572	75	36	1800	50.0	1700	47.2
2584	87	40	2150	53.7	2050	51.2
2593	96	42	2300	54.8	2200	52.4

Source: Fluorescent Lighting Association Handbook.

*Wattage and lumens per watt for lamp only. Add watts
loss in transformers for total watts and overall
efficiency.

**Low pressure (LP) lamps. High pressure lamps (HP) also available. See FLA Handbook for data on operation at other lamp currents and for other colors.

LIGHTING DESIGN AND LAYOUT DATA (continued)

LAMP SPECIFICATIONS

	11	CANDESCENT PRO.	JECTOR AND REF	LECTOR LAMPS	
Bulb Type	Watts	Beam Spread (Degree)*	Beam Lumens*	Candlepower (10° Cone) **	Chart No.
		S	pot Beam Type		
R-30 PAR-38 R-40 R-40 R-40	75 150 150 300 500	50 30 40 35 35	350 1100 810 1600 2600	1,800 10,500 6,000 13,500 22,000	A E C G -
		F	lood Beam Type		
R-30 PAR-38 R-40 R-40 R-40	75 150 150 300 500	130 60 110 115 115	610 1350 1500 2900 4600	430 3,500 1,250 2,400 3,800	B F D H
		N	arrow Beam Type		
PAR-46 PAR-56 PAR-56	200 300 300	17x23 15x20 20x35	1200 1800 1800	30,000*** 65,000*** 20,000	=

Source: G. E. Lamp Dept. Bulletin LS-152

NOTE--See lamp mfgrs. catalogs for more detailed data.

* Measured to 10° of maximum candlepower
** Average initial CP in 10° cone
*** Values per central 5° cone

STANDARD MERCURY VAPOR LAMPS

Lamp Designation	Approx. Watts*	Bulb	Light Center Length (in.)	Approx. Lumens	L/W*
H250-A5	250	T-18	5 in	11,000	44.0
H400-A1	400	T-16	7 3/4	15,000	37.5
H400-E1	400	BT-37	7	20,000	50.0
H400-E1T	400	T-20	7	20,000	50.0
H400-J1	400	BT-37	7	17,000	42.5
H400-R1	400	R-52		14,500	36.3
H400-RC1**	400	R-52		17,500	43.7
H700-A18 H700-B18**	700 700	BT-46 BT-46	9 1/2 9 1/2	35,000 33,000	50.0 47.2
H1000-A12	. 1000	BT-56	9 3/8		
H1000-A15	1000	BT-56	9 3/8	52,000	52.0
H1000-C15**	1000	BT-56	9 3/8	46,000	46.0
H3000-A9	3kw	T-9 1/2		132,000	44.0

^{*}Lamp only; does not include transformer watts loss.

Use this table for general information only. Consult manufacturers' published data for more detailed information.

STANDARD INCANDESCENT LAMPS

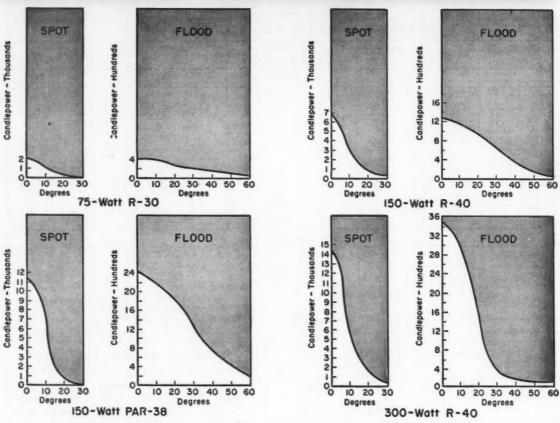
Watts	Bulb	Initial Lumens	Initial L/W	Rated Life (Hours)	Light Center Length
25	A-19	265	10.6	1000	2 1/2
40	A-19	465	11.6	1000	2 7/8
60	A-19	835	13.9	1000	3 1/8
75	A-19	1150	15.3	750	3 1/8
100	A-21	1630	16.3	750	3 7/8
150	A-23	2650	17.7	750	4 5/8
200	PS-30	3700	18.5	750	6
300	PS-35	5650	18.8	1000	7
500	PS-40	9900	19.8	1000	7
750	PS-52	15600	20.8	1000	9 1/2
1000	PS-52	21500	21.5	1000	9 1/2
1500	PS-52	33000	22.0	1000	9 1/2
500	T-20*	9300	18.6	1000	4
750	T-24*	14000	18.7	1000	5 1/2
1000	T-24*	19500	19.5	1000	5 1/2

*Special heat-resistant glass bulb, inside frost, with medium bipost base for base up burning.

NOTE—For complete listing, see lamp manufacturers' catalogs. All lamps listed above are inside frost type general service lamps.

^{**} Color improved with fluorescent phosphors.

LIGHTING DESIGN AND LAYOUT DATA (continued)



			FL	LOODLIGHT LA	MPS				
Lamp Designation	Watts	Bulb	Base	Burning Position	Filament	Approx. Hours Life	Lumens	Light Cntr. Lgth.	Max. Ovrl. Lgth.
100R30/FL/RS 250G/FL 400G/FL 500G/FL 1M/G40FL 1500G48/6	100 250 400 500 1000 1500	R-30 G-30 G-30 G-40 G-40 G-48	Med. Med. Med. Mog. Mog.	Any Base Down To Horizontal	C-17 C-5 C-5 C-5 C-5 C-5	1000 800 800 800 800 800	3750 6700 9000 19000 30000	3 3 4 1/4 5 1/4 5 1/4	5 3/16 5 1/8 5 1/8 7 1/16 8 8 5/8
			TYPICA	L SPOTLIGHT	LAMPS				
Lamp Designation	Watts	Bulb	Base	Burning Position	Filament	Approx. Hours Life	Lumens	Light Cntr. Lgth.	Max. Ovrl. Lgth.
100A21/SP 100A21/1SP 150/150G30/32 250G/SP 400G/SP 500G/SP 500T20/64 1M/G40SP4 1/4 1M/G40SP5 1/4 100T24/6 2M/G48/17 2M/T30/1	100 100 150 250 400 500 500 1000 1000 1500 2000 2000	A-21 A-21 G-30 G-30 G-40 T-20 G-40 G-40 T-24 G-48 T-30	Med. Med. 3C Mog. Med. Mog. Mog. Mog. Mog. Bip. Mog. Bip.	Down To Hor. Base Up Base Down Base Down To Horizontal Base Down To Horizontal Base Up Base Down Base Up	C-5 C-5 C-5 C-5 C-5 C-13 C-5 C-13D C-13D	200 200 200 200 200 500 200 200 200 200	1350 1350 4700 8000 10200 9500 22500 22500 33500 52000 48000	3 3 3 3 4 1/4 2 3/16 4 1/4 5 1/4 6 1/2 6 1/2	4 7/16 4 7/16 5 9/16 5 1/8 5 1/8 7 1/16 5 3/4 7 1/16 8 10 9 3/8

EQUIPMENT DESIGN DATA

	Used fo	r General	Lighting	
Number and	Weight	Line	Power Con	sumed (Watts)
Type Lamp	(lbs)	(amps)	Ballast	Per Lamp*
For	60-cycle,	110-125	Volt Circuits	3
2 - 20	31/4	.42	9	24.5
2 - 30	61/4	.70	18	39.0
2 - 40	61/4	.85	15.5	47.8

DATA ON TYPICAL FLUORESCENT BALLASTS

For 6	0-cycle, 1	10-125 V	olt Circuits	5
2 - 20	31/4	.42	9	24.5
2 - 30	61/4	.70	18	39.0
2 - 40	61/4	.85	15.5	47.8
2 - 40 RS	51/2	.85	17	48.5
2 - 40 15	11	.98	28	54.0
2 - 48 T12	11	.98	28	52.0
2 - 72 T12	15	1.40	33	71.5
2 - 96 T12	18	1.75	45	96.5
For	50-Cycle,	199-216 V	olt Circuit	s
2 - 40 RS	61/4	.49	19	49.5
For	60-cycle,	220-250 V	olt Circuit	5
2 - 40	61/2	.45	18.5	49.2
2 - 90 T17	15	1.10	32	106.0
2 - 40 RS	61/4	.43	19	49.5
For	60-cycle,	240-280 V	olt Circuit	5
2 - 40	61/2	.37	18	49.0
2 - 40 RS	61/4	.40	19	49.5
2 - 48 T12	161/4	.43	28	52.0
2 - 96 T12	13 **	.72	32	90.0

1.65 Source: General Electric Co. Bulletin LS-101, March, 1954.
* Lamp wattage plus loss in ballast.

1.00

35

107.5

99.0

161/4

171/2

** Series type ballast.

2 - 90 T17 4 - 90 T17

MA IOD CAUSES OF LIGHT LOSS

Cause of Depreciation	Percent Loss
Lamp Depreciation (End of rated life)	
Incandescent	20
Fluorescent	30
Mercury Vapor	23
Circuit Voltage Depreciation	
With adequate wiring	Negligible
With poor wiring and overloading of	
circuits	5-20
Luminaire Light Absorption	18-35
Paint Depreciation	
Absorption of light by walls, ceilings,	5
floors and other surfaces	(per year)
Dirt and Dust Depreciation	
1-month cleaning intervals	10
3-month cleaning intervals	15
6-month cleaning intervals	20
Cleaned when lamps burn out	30
Lamp Outage Depreciation	Up to 12

COMPARATIVE STROBOSCOPIC EFFECT OF VARIOUS LIGHT SOURCES Operated on 60-Cycle Supply

Lamp Type	Method of Operation	Relative Stroboscopic Effect
	Incandescent	
200-watt		1
40-watt		7
	Fluorescent	
Green	Single-lamp ballast	11
Blue	Single-lamp ballast	49
White	Single-lamp ballast	19
White	2-lamp ballast	9
White	Single-lamp ballast on each phase of 3-phase circuit (3 lamps)	3
White	3 lamps: 1 on single-lamp ballast, 2 on 2-lamp ballast	14

Source: IES Lighting Handbook

LIGHT SOURCE EFFICIENCIES

Source	Approx. Lumens per Watt
Candle (Luminous Efficiency Equivalent)	0.1
Oil Lamp (Luminous Efficiency Equivalent)	0.3
Original Incandescent Lamp (1879)	1.4
60-Watt Carbon Filament Lamp (1905)	4.0
60-Watt Coiled Coil Tungsten Filament Lamp	
(1954)	13.9
1000-Watt General Service Lamp (1954)	21.8
No. 1 Photoflood Lamp (1954)	34.6
1000-Watt A-H12 Mercury Vapor Lamp	
(Lamp Only-1954)	55.0
40-Watt White Fluorescent Lamp	
(Lamp Only-1954)	64.0

Source: Westinghouse Lighting Handbook (1954)

TYPES OF MAINTENANCE EQUIPMENT Used for Lighting Servicing

Equipment	Me	ounting h	leight (F	eet)
Equipment	To 12	12-18	18-30	Over 30
Catwalk (Or Truss)			×	×
Crane (Where Available)			×	×
Crows-Nest Ladder			×	
Disconnecting Hanger		×	×	×
Portable Mainte- nance Platform		×	×	
Relamping Bridge			×	×
Step Ladder	×			
Straight Ladder		×		
Telescoping Plat- form Tower		×	×	

A SUMMARY OF CALCULATIONS NECESSARY TO DETERMINE ELECTRIC SPACE HEATING LOADS

1. Design temperature difference of locality in which installation is to be made:

Design temperature difference = outdoor design temperature - indoor temperature

- Obtain outdoor design temperature from Table 11.
- 70F is usually used as indoor temperature.
- 2. Watts required to offset loss through building materials:

Watts = area \times transmission loss factor \times design temperature difference

• Make this calculation for each room for each of the following:

Outside walls

Windows

Outside doors

Ceiling (if space above is not heated)

Floor (if space below is not heated)

- Obtain areas of each of the above from plans, specifications, or actual measurements.
- Obtain transmission loss factors for each of the above from Tables 1 through 9 on the following pages.
 Building materials involved must be obtained from plans or specifications or by actual examination of structure.
- Design temperature difference is as calculated in (1) above.
- 3. Watts required to offset loss due to infiltration:

Watts = .0053 × volume × air changes per hour × design temperature difference

- · Make this calculation for each room.
- Obtain room volume by multiplying length x width x ceiling height.
- Obtain number of air changes per hour from Table 7.
- Design temperature difference is as calculated in (1) above.
- 4. Rating in watts of heating equipment for each room:

Watts = transmission loss + infiltration loss

- Transmission loss is as calculated in (2) above.
- Infiltration is as calculated in (3) above.
- 5. Estimated annual kilowatt-hour consumption:

Kilowatt-hours = kilowatts x degree-days x 18.5 70 - outdoor design temperature

- For "kilowatts" use sum of all room ratings found in (4) above, converted to kw.
- Obtain degree-days and outside design temperature from Table 11. (Outside design temperature should be same value as used in (1) above.)
- Note: This formula is often modified by heating people by replacing the factor 18.5 with values as high as 24, or as low 12, based on their own experience with particular heating equipment in the same general locality.

6. Estimated annual heating cost:

Cost = annual kilowatt-hours x local power rate

- Annual kilowatt-hours are as calculated in (5) above.
- Rate applicable to electric heating should be obtained from local utility.
- 7. Adjustment of equipment rating due to variations in supply voltage:

Watts required = calculated watts $x \left(\frac{\text{rated voltage}}{\text{actual voltage}} \right)^2$

- This adjustment should be made if the actual voltage available to the premises differs from the rated voltage of the equipment.
- Calculated watts are as found in (4) above.
- Rated voltage of heating equipment should be obtained from manufacturer (usually 118 or 236 volts).
- Actual voltage should be obtained by measurement or from competent source.
- If "watts required" as found by this formula is much greater than as calculated in (4) above, wattage rating of installed equipment must be increased accordingly.

8. Installation

- Wattage requirements for each room as found in (4) and adjusted in (7) above should be met, the actual placement and number of heating units depending upon the type of heating equipment selected.
- Use Chart 2 to determine sizes of circuit conductors.
- Actual circuit lengths should be kept below those shown on chart wherever possible to avoid unnecessary reduction in voltage.

HEAT LOSS COEFFICIENTS

TABLE 1. FRAME WALLS

				TR	ANSMI	TRANSMISSION LOSS (Watts per sq ft per OF temp diff)	.055 (W	Yatts pe	r sq ft.	er oF	emp dif	(4)			1
Exterior		Poo W	Wood Siding, Wood Shingles, Wood Panels	8, 04		Woo	Bac Sphalt	Wood Shingles with Insulated Backer Board or Asphalt Insulating Siding	th Insul	ated		Bri	Brick Veneer or Plywood (3/8 in.)	eer 8 in.)	
/		Sh	Sheathing*	*			S	Sheathing*	3.0			S	Sheathing*	* 6	
Interior Finish **	2	Ply.	Wood	Insul	Insulating Board	2	Ply.	Wood	Insul	Insulating Board	200	Ply.	Poo M	Insul	Insulating
	1			% in.	l in.		Poo*		% in.	l in.				½ in.	- in.
Metal Lath; Plaster (3/4 in.)	160.	160.	.076	.070	.062	920.	.079	.067	.062	.053	.103	.105	.085	.079	.064
Gypsum Board (3/8 in.)	.085	.088	.073	.067	.059	.073	.073	.064	.059	.053	.097	.097	.079	.073	.062
Wood Lath; Plaster	.082	.085	.070	790.	.056	.070	.073	.062	.059	.053	.094	.094	.079	.073	.062
Gypsum Lath (3/8 in.); Plaster	.082	.085	.070	.067	.056	.070	.073	.062	.059	.053	.094	.094	.079	.073	.062
Insulating Board Lath (1/2 in.); Plaster	.064	.064	.056	.053	.047	.056	.056	.050	.047	.044	.067	.070	.062	.056	.050

*Sheathing details: Gypsum 1/2 in.; Plywood 5/16 in.; Wood 25/32 in. plus building paper; Insulating Board 25/32 in. Furring strips 1 in. thick are assumed

**Plaster, where used, assumed 1/2 in. thick, sand aggragate, unless otherwise stated.
Note: See Chart 1 for factors corrected for insulation.

TABLE 2. MASONRY WALLS

					TRA	NSMI	SSION	LOSS	(Watt	s per	d th p	40	TRANSMISSION LOSS (Watts per sq ft per OF temp diff)	(9)				
Exterior Facing			Preca	Face Brick (4 in.), or Stone (4 in.), or Precast Concrete (4 to 6 in.)	ck (4 crete plus	Stone (4 in.), or Stone (4 in.), or concrete (4 to 6	or 6 in.)					O s	Common Brick (4 in.) or Precast Concrete (8 in.)	Brick or oncret plus	(4 in.	- :		
Exterior Backing Finish*	3 4	Concrete		I	Hollow Clay		0	Concrete		o .	Concrete		_	Tile W		U	Concrete	
			F	Thickness (inches)	ss (in	ches)							Thickness (inches)	iss (in	ches)			
	4	8	12	7	80	12	4	9	80	4	8	12	7	80	12	7	9	80
None	.144	.120	1111	.120	160.	.076	176		.149	.123	.105	.100	.105	.082	.070	.146	.138	.126
Plaster (5/8 in.) on wall	.135	114	.108	114	.088	.073	.164	.152	141	.117		.097	.103	.082	.067	.141	.129	.120
Metal Lath: Plaster (3/4 in.); Furring	.094	.082	.079	.082	.067	.059	.105	.100	.094	.085		.073	920.	.064	.056	.094	160.	.085
Gypsum Lath (3/8 in.); Furring	.088	.079	.076	.079	.064	.056	.100	.094	160.	.079	.073	.070	.073	.062	.053	.088	.085	.082
Gypsum Lath (3/8 in.); Plaster; Furring	.085	920.	.073	920	.064	.056	.097	160.	.088	.079	.070	.067	.070	.059	.053	.088	.082	.079
Insulating Board Lath (1/2 in.); Furring	.064	.062	.059	.062	.053	.047	.073	.070	.067	.062	.056	.056	950.	.050	.044	.067	.064	.062
Insulating Board Lath (1/2 in.); Plaster; Furring	.064	.059	-059	.059	.053	.047	.070	.067	.064	.062	.056	.053	950.	.050	.044	.064	.064	.062
Wood Lath; Plaster	.085		.073	.076	.064	.056	.097	160.	.088	.079	.070	.067	.070	.059	.053	.088	.082	.079

.2.in. furring and 1/2.in. plaster (sand aggragate) assumed, unless otherwise stated.

HEAT LOSS COEFFICIENTS

TABLE 3. FRAME CEILINGS AND FLOORS

		TRA	TRANSMISSION LOSS (Watts per sq ft per oF temp diff)	Watts per sq ft pe	er oF temp diff)	
Type of Floor				Wood Subfloor (2	Wood Subfloor (25/32 in.) and felt plus	
Type of ceiling below joists *	e c o X	Wood Subfloor 25/32 in.	Cement (1 ½ in.) and Ceramic Tile (1/2 in.)	Hardwood Floor (3/4 in.)	Plywood (5/8 in.) and Floor Tile or Linofeum (1/8 in.)	Insulating Board (3/8 in.) and Hard Board (1/4 in.) and Floor Tile or Linoleum (1/8 in.)
None		.132		.100	160.	.082
Gypsum Board (3/8 in.)	.190	.088	.079	.070	790.	.062
Gypsum Lath (3/8 in.); Plaster	.179	.085	.076	.073	.064	.062
Metal Lath; Plaster (3/4 in.)	.217	160.	.082	.076	.070	.064
Insulating Board (1/2 in.)	==	.064	.059	.056	.053	.050
Insulating Board Lath (1/2 in.); Plaster	.105	.064	.059	.056	.053	.050
Acoustical Tile (3/4 in.) on Gypsum Board (3/8 in.)	.088	.056	.053	.050	.047	.044
Acoustical Tile (3/4 in.) on Furring	760.	.062	.056	.053	.050	.047
Wood Lath; Plaster	.182	.085	.076	.073	.064	.062

Note: Since well-insulated electrically heated structures require a ventilated attic space, the roof construction is normally disregarded and the attic space assumed * 1/2 in. plaster (sand aggragate) assumed unless otherwise stated. to be at outside temperature.

TABLE 4. CONCRETE CEILINGS AND FLOORS

				TRA	NSMISSIO	N LOSS	TRANSMISSION LOSS (Watts per sq ft per °F temp diff)	sq ft per	F temp	(JJIP		
/								Susp	Suspended Ceiling	iling		
/	Type of	×		ling Appl	pei					Acoustical	al Tile	
	Ceiling	Ceiling		to Slab		Gypsum (3/8 i	Board in.)	Metal	On Furring or Channels	urring	On G	On Gypsum pard (3/8 in.)
crete	Type of Finish Floor		Plaster	Acousti	Acoustical Tile	Without	With	With	1/2 in	2/4 in	1/2 in	2/4 in
(inches)			(1/8 in.)	1/2 in.	3/4 in.	Plaster	_	(3/4 in.)	7 /1	6/4		7
\vdash		.182	179	.105	.085	.105	.103	111.	620.	.070	.073	.064
	Floor tile (asphalt, rubber, plastic, % in.)	.176	.173	.103	.085	.103	.100	111.	.079	.067	.073	.064
9 04 1	4 to 6 Wood block (13/16 in.) on slab	.123	.123	.082	.070	.082	.082	.088	.067	.059	.062	950.
	Wood subfloor (29/32 in.); felt, and	.070	.070	950.	.050	.056	.053	.056	.047	.044	.044	.041
Ī		.152	.149	.094	620.	.094	160.	.100	.073	.064	.067	.059
	Floor tile (asphalt, rubber, plastic, 1/6 in.)	.146	.146	160.	920.	.094	160.	.100	.073	.064	.067	.059
10 10	8 to 10 Wood block (13/16 in.) on slab	.108	.108	920.	.064	920.	.073	620.	.062	950.	.059	.053
	Wood subfloor (29/32 in.); felt, and hardwood (3/4 in.)	.064	.064	.053	.047	.053	.050	.053	.047	.041	.044	.038

**Plaster and concrete assumed to be of sand aggragate.

HEAT LOSS COEFFICIENTS

TABLE 5. SOLID WOOD DOORS

Nominal Thickness		SSION LOSS per °F temp diff)
(inches)	Exposed Door	With Glass Storm Door*
**	.249	.114
1	.188	.108
1 1/4	.161	.100
1 1/2	.144	.094
1 3/4	.141	.091
2	.126	-082
2 1/2	:105	.076
3	.091	.067

^{* 50%} glass and thin wood panels

TABLE 6. WINDOWS

	(Wat	TRANSMISSION	
Number of Vertical Glass	Single Glass	Unit-Type Double Glazing	Single Glass with Storm Sash
Type of Sheets		Air Space (inc	hes)
	None	1/4 to 1/2	1 or more
Large glass areas;			
no sash	.331	. 155	
Wood	.299	.148	.140
Steel	.331	.186	.155
Aluminum	.363	.202	.171

^{*}Windows with sash assumed 80% glass, 20% sash.

TABLE 7. AIR CHANGES

	IND	LL /.	WILL P	LIMITOLS		
For	Estimating	Reside	ntial l	nfiltration	Heat	Loss

	Air Changes per Hour				
Condition	Without Storm Sash or Weather- stripping	With Storm Sash or Weather- stripping			
Room with no windows or outside	1/2 to 3/4	-			
Room with 1 wall exposed	1	1/2			
Room with 2 walls exposed	1-1/2	3/4			
Room with 3 walls exposed	2	1			
Room with 4 walls exposed	2	1			
Bath Room	2	2			

TABLE 8. CONCRETE FLOOR SLABS (Unheated)

Outdoor Design Temp.	TRANSMISSION LOSS (Watts per ft of exposed edge)				
(°F)	2-inch Edge Insulation [®]	1-inch Edge Insulations			
- 20 to - 30	14.5	16			
- 10 to - 20	13	14.5			
0 to - 10	12	13.5			

^{*} Insulation should extend 24 inches horizontally under floor; or 24 inches down along the foundation wall below floor level.

TABLE 9. BASEMENT WALLS*

Type of Wall	TRANSMISSION LOSS (Watts per sq ft per °F temp diff)
Concrete or Concrete Block	.02

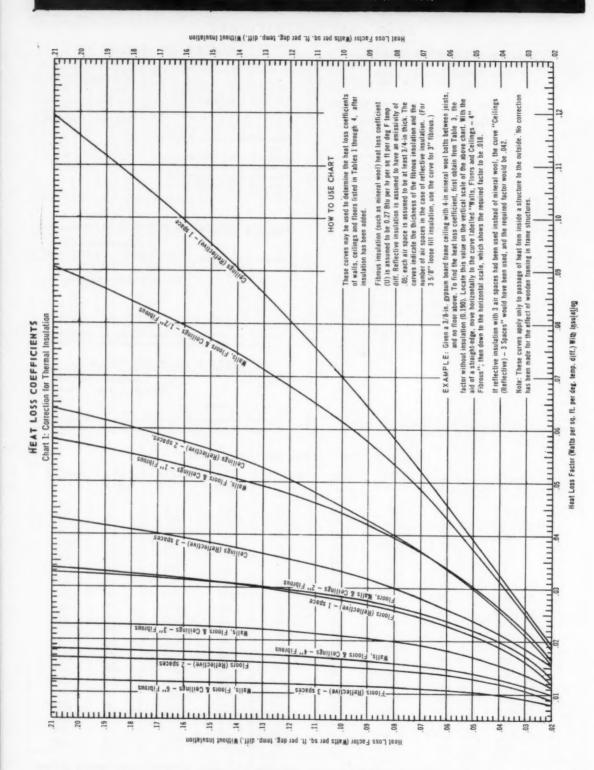
^{*} For walls 3 ft or more below grade. For portion of walls from 3 ft below to grade level, use factors given in Table 3.

TABLE 10. HEAT LOSS CONVERSION TABLE*

BTU per hr	WATTS								
.01	.0029	.21	.062	.41	.120	.61	.179	.81	.237
.02	.0059	.22	.064	.42	.123	.62	.182	.82	.240
.03	.0088	.23	.067	.43	.126	.63	.185	.83	.243
.04	.0117	.24	.070	.44	.129	.64	.188	.84	.246
.05	.0146	.25	.073	.45	.132	.65	.190	,85	.249
.06	.0176	.26	.076	.46	.135	.66	.193	.86	.252
.07	.0205	.27	.079	.47	.138	.67	.196	.87	.255
.08	.0234	.28	.082	.48	.141	.68	.199	.88	.258
.09	.0264	.29	.085	.49	.144	.69	.202	.89	.261
.10	.029	.30	.088	.50	.146	.70	.205	.90	.264
.11	.032	.31	.091	.51	.149	.71	.208	.91	.267
.12	.035	.32	.094	.52	.152	.72	.211	.92	.270
.13	.038	.33	.097	.53	.155	.73	.214	.93	.272
.14	.041	.34	.100	.54	.158	.74	.217	.94	.275
.15	.044	.35	.103	.55	.161	.75	.220	.95	.278
.16	.047	.36	.105	.56	.164	.76	.223	.96	.281
.17	.050	.37	.108	.57	.167	.77	.226	.97	.284
.18	.053	.38	.111	.58	.170	.78	.229	.98	.287
. 19	.056	.39	.114	.59	.173	.79	.231	.99	.290
.20	.059	.40	.117	.60	.176	.80	.234	1.00	.293

^{*}Tables 1 through 9 and Chart 1 were computed from data from the 1957 Guide of the American Society of Heating and Air-Conditioning Engineers. For other constructions given in the Guide and not included in these tables, apply the above factors to convert Btu per hr to watts.

^{**} Thin wood panels or single panes of glass



Note: The above curves were plotted from data given in Chapter 9 of the 1957 Guide of the American Society of Heating and Air-Conditioning Engineers.

CHART 2: RECOMMENDED WIRE SIZES AND CIRCUIT LENGTHS FOR ELECTRIC SPACE HEATING CIRCUITS

No. 6 No. 4 ž - Se No. 6 No. 8 No. 8 No. 10 No. 10 Ne. 10 No. 12 No. 12 No. 12











10,000

Use Scale B: If any part of the wiring is installed in heated interior walls or partitions.

Use Scale A: If the wiring is installed either in heated exterior walls outside of the thermal insulation;

For wire Type RH (or equivalent): Use scales A, B or C at top of chart.

or above heated ceilings over thermal insulation at least 2 inches thick; or in walls, partitions or ceil-

ings which do not contain heating equipment.

650

Use Scale C: If any part of the wiring is installed above heated ceilings within the thermal insulation, or above heated ceilings having no thermal insulation. Scales A, B and C may also be used to find required sizes of wiring not connected with the heating system but passing through walls or ceilings as described above.

350

In using chart for 115-voit circuits, follow the procedure described below, but begin with a heating load equal to twice the actual load. 00

MAXIMUM ONE-WAY CIRCUIT LENGTH (FEET)
POR 2% VOLTAGE DROP

- 250

HOW TO USE CHART

Assume load is a 5000-watt, 230-volt heater, the wiring to be entirely in outside walls outside the thermal insulation.

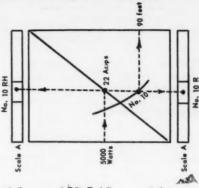


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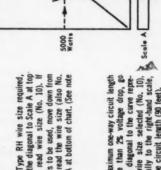
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05







HEATING LOAD SERVED BY CIRCUIT (WATTS)

Seele C

Seale A Seels B

TABLE II. DEGREE-DAYS AND DESIGN TEMPERATURES (°F)

Locality D	egree Days	Outside Design Temp.	Locality	Annual Degree Days	Outside Design Temp.	Locality	Annual Degree Days	Outside Design Temp.	Locality D	nnual Jegree Days	De	side
ALABAMA			INDIANA			NEVADA			RHODE ISLAN	D		
Anniston	2820	+ 5	Fort Wayne	6287	- 10	Reno	6036	- 5	Block Island	5843		0
Birmingham	2780	+ 10	Indianapolis	5134	- 10	Winnemucca	6369	- 15	Providence	5607		0
Nobile	1529	+ 15	Terre Haute	5366	- 10	Williemucca	0303	- 13	Floatdelice	3007		U
	1954	+ 10	Terre naute	3300	- 10	NEW HAMPSH	HIRE		SO. CAROLIN	A		
Montgomery	1334	+ 10	IOWA			Concord	7612	- 15	Charleston	1769	4	15
ADIZONA			Charles City	7504	- 15	Concord	1012	- 13	Columbia	2284		10
ARIZONA			Davenport	6091	- 15	NEW JERSEY	1		Greenville	3060		10
Flagstaff	7525	- 10	Des Moines	6274	- 15	Atlantic City	4741	+ 5	Glechanie	3000	+	10
Phoenix	1492	+ 25	Sioux City	7012	- 20	Cape May	4870	0	SO, DAKOTA			
Yuma	951	+ 30	SIOUX CITY	1012	- 20	Newark	5252	0	Huron	7902	-	20
			KANSAS			Sandy Hook	5369	0	Rapid City	7535		20
ARKANSAS			Concordia	5323	- 10	Trenton	5068	0		1000	_	20
Fort Smith	3188	+ 10	Dodge City	5058	- 10	Henton	JU00	U	TENNESSEE			
_ittle Rock	2982	+ 5	Topeka	4919	- 10	NEW MEXICO)		Chattanooga	3384		10
	2002		Wichita	4571	- 10 - 10	Albuquerque	4389	0	Knoxville	3590		0
CALIFORNIA			wichita	43/1	- 10	Minudaeidae	4303	U	Memphis	3006		0
	4622	- 20	KENTUCKY			NEW YORK			Nashville	3513		0
Eureka	4632	+ 30	Louisville	4279	0	Albany	6319	- 10	Mashalle	2212		U
Fresno	2532	+ 25	Louisville.	4213	U	Binghamton	6556	- 10	TEXAS			
os Angeles	1451	+ 35	LOUISIANA			Buffalo	6838	- 5	Abilene	2657		15
Red Bluff	2546	+ 25	New Orleans	1175	+ 20	Canton	8305	- 25	Amarillo	4345		10
Sacramento	2600	+ 30	Shreveport	2117	+ 20			- 25 - 15		617		30
San Diego	1574	+ 35	Silleveholt	2111	+ 20	Ithaca	6914	- 13	Brownsville			
an Francisco	3069	+ 35	MAINE			New York	5050	-	Corpus Christ		+	20
an Jose	2410	+ 25	Eastport	8246	- 10	Oswego	6975	- 10	Dallas	2272		0
			Greenville	9439		Rochester	6863	- 5	Fort Worth	2361		10
COLORADO					- 20	Syracuse	6520	- 10	Houston	1276		20
Denver	5673	- 10	Portland	7681	- 5	NO. CAROLI	MA		Palestine	1980		15
Grand Junction		- 15	MARYLAND			1200 0100000		10	Port Arthur	1340		20
Pueblo	5709	- 20	Baltimore	4203	0	Charlotte	3205	+ 10	San Antonio	1579	+	20
ruebio	3/03	- 20	Darumore	4203	U	Raleigh	3075	+ 10	UTAU			
CONNECTION	-		MASSACHUSI	ETTS		Wilmington	2323	+ 15	UTAH			
CONNECTICU			Boston	5791	0				Modena	6598		15
Hartford	6139	0	DOSIDII	3/31	U	NO. DAKOT	A		Salt Lake City	5463	-	- 10
New Haven	6026	0	MICHIGAN			Bismark	9033	- 30	VERMONT			
*			Detroit	6404	- 10	Devils Lake		- 30	VERMONT			
D. C.			Grand Rapids		- 10	Williston	9068	- 35	Burlington-	7865	-	- 10
Washington	4258	0	Lansing	6982	- 10	ministon	3000	- 55	VIRGINIA			
n asim geon	1200	•	Laising	0302	- 10	ОНЮ				0007		
FLORIDA			MINNESOTA				4522	0	Cape Henry	3307		10
	1207	. oc	Duluth	9574	- 25	Cincinnati	4532	0	Lynchburg	4153		- 5
Apalachicola	1307	+ 25	Minneapolis	7853	- 20	Cleveland	5717	0	Norfolk	3119		- 15
lacksonville	1113	+ 25	St. Paul	7804	- 20	Columbus	5277	- 10	Richmond	3720	+	- 15
Key West	.77	+ 45	St. Faul	7004	- 20	Dayton	5597	0	WASHINGTON	11		
Miami	173	+ 35	MISSISSIPPI			Sandusky	5859	0		7		
Pensacola	1435	+ 20	Meridian	2333	+ 10	Toledo	6394	- 10	North Head	5211		- 20
Гапра	674	+ 30	Vicksburg	2000	+ 10				Seattle	4438		- 15
				2000	7 10	OKLAHOMA			Spokane	6852	+	- 15
GEORGIA			MISSOURI			Oklahoma Ci	tv 3519	0	Tacoma	4866		- 15
Atlanta	2811	+ 10	Columbia	5113	- 10				Tatoosh Islan	d 5724	4	- 15
Augusta	2138	+ 10	Kansas City	4888	- 10	OREGON			W VIDCINIA			
Macon	2049	+ 15	St. Louis	4469	0	Baker	7087	- 5	W. VIRGINIA			
Savannah	1710	+ 20	Springfield	4693	- 5		4547	+ 5	Elkins	5773		- 10
Ja v dilli di	1110	7 20	springireiu	4033	_ ,	Medford			Parkersburg	4750	-	- 10
DAHO			MONTANA			Portland	4143	+ 10	MICCONCIN			
	5000	10				Roseburg	4122	+ 10	WISCONSIN			-
Boise	5890	- 10	Havre	8213	- 30	DENIMA			Green Bay	8259		- 20
Pocatello	6976	- 5	Helena	8126	- 20	PENNSYLV			LaCrosse	7650		- 25
			Miles City	7850	- 35	Erie	6116	- 5	Madison	7300	-	- 15
ILLINOIS			HEDELOW			Harrisburg	5258	0	Milwaukee	6944	-	- 15
Cairo	3756	0	NEBRASKA			Philadelphia		Õ	1101011111			
Chicago	6310	- 10	Lincoln	5865	- 10	Pittsburgh	5048	0	WYOMING			
Peoria	6087	- 10	North Platte		- 20	Reading	5060	ő	Cheyenne	7562	-	- 15
	5225	- 10	Valentine	7075	- 25	Scranton	6047	- 5	Lander	8303		- 20

DESIGN CONSIDERATIONS

Following is an outline of usual factors involved in laving out paging, public address and music distribution systems:

I. LOUDSPEAKERS

- A. Number of speakers (depends upon size, shape and type of area)
 1. One or a few, each operating at high output (high-level speaker system)
 2. Relatively large number, each operating at low output (low level speaker system)
- B. Types of speakers
 1. Cone speakers in wall-mounted.
 - ceiling-mounted, or suspended-baf-fle enclosure 2. Horn speaker (trumpet, projector horn, re-entrant horn, etc)
- C. Amplifier connection
 1. Direct connection to amplifier output taps corresponding in impedance value (ohms) to impedance value (ohms) of a single speaker or of a number of speakers in series, parallel, or series-parallel

 - allel, or series-parallel
 2. Connection to amplifier constantvoltage output taps (70, 100, 140
 volts, etc) through constant-voltage
 line-matching transformers
 3. Connection to amplifier high-impedence output taps (250 or 500 ohms)
 through constant-impedance linematching transformers
- Placement of speakers
 Assure uniform loudness (eliminate deed or hot spots)
 - 2. In churches, theatres and auditor-iums, place speakers well forward of microphones to prevent feedback
 - (squeeling)
 3. Minimize reverberation (sound bouncing around)

II. AMPLIFIERS

- A. Power output

 - 1. Typical ratings: 6, 10, 15, 30, 50, 70, 100, 125, 250 watts
 2. Output required depends upon size and type of area to be covered by sound system (see accompanying
- B. Number and types of inputs (terminals for connecting high- and/or low-im-pedance microphones, record player or
- C. Output taps (impedance values)
 1. Direct connection: 4-, 8- and 16-ohm
 - taps
 2. Constant-voltage line transformer connection: 70-, 100- or 140-volt
 - taps
 3. Constant-impedance line transformer connection: 250- and/or 500-ohm
- D. Special functions
 1. Record player built into amplifier 2. Amplifier, microphone and speakers in carrying case (portable system)

 E. Controls
- E. Centrals
 1. Tone
 2: Anti-feedback
 F. Remote volume controller (plug-in unit for use at distance from amplifier)
 G. Power source
- Power source
 1. 110-125 vac, 60 cycles
 2. 115 vac, 25 cycles

- 3. 115 vdc
 4. 6 or 12 vdc
 H. Amplifier mounting
 1. Portable, with protective cage
 2. Panel-mounted, for installation on
- Cost (increases with power rating and fidelity of reproduction)
 Separate preamp unit (for one or more remotely located power or booster amplifiers)
 K. Custom assemblies (amplifier, preamp,
- amplitiers)
 Custom assemblies (amplifier, preamp,
 radio tuner, record player, or other input devices mounted in vertical cabinet
 rack or console cabinet)
- III. INPUT DEVICES

 - INPUT DEVICES
 A. Microphones
 1. Crystal, dynamic or velocity
 2. Omni-directional, bi-directional, or
 uni-directional (cardioid)
 B. Record player (automatic or manual)
 C. Tape player
 D. FM-AM radio tuner
 E. Tone generator
- Tone generator

 To produce tone signal for factory
 work shifts, lunch periods, etc.

 Electronic siren for alarm applica-

 - 3. To simulate sound of large bell in church belfrys

TYPICAL SYSTEM DATA FOR VARIOUS APPLICATIONS

Application	Sq. Ft. Area	Amplifier Rating (Watts)	Number of Speakers	Type of Speakers	
	2,000	15	2	12" Cone in Wall Baffles	
Auditoriums	5,000	30	2	12" Cone in Wall Baffles o	
	15,000	50	4	12" Projector Horns	
	2,000	15	4		
Ballrooms	4,000	30	4	12" Cone in Wall Baffles	
	10,000	50	6		
	1,000	10	2	10" Cone in Wall Baffles	
Churches	4,000	15	2	sau a i . w ii p ffi	
	15,000	30	4	12" Cone in Wall Baffles	
Classrooms,	500	10	1	8" Cone in Wall Baffle	
Offices and	2,000	15	2	10" Cone in Wall Baffles	
Stores	8,000	30	4	10" Cone in Wall Barries	
	1,000	15	2	10" Brainster Home	
Factories	4,000	30	4	12" Projector Horns	
ractories	8,000	50	4	Re-Entrant Horns	
	40,000	100	10	Ke-Entrant Horns	
	1,000	10	1		
Funeral Parlors	4,000	15	4	12" Cone in Wall Baffles	
Pariors	10,000	30	8		
Restaurants	1,000	15	2		
and	5,000	30	6	12" Projector Horns	
Night Clubs	10,000	50	12		
Stadiums	3,000	15	2	12" Cone in Wall Baffles	
and	10,000	30	4	Do Fatama Mana	
Gymnasiums	50,000	100	8	Re-Entrant Horns	

NOTES:

- 1. Values given in table are averages—not minimums or maximums.
- 2. Number of speakers and amplifier power rating should be increased where background noise is higher than normal for the type of area.
- 3. Although wall baffles are indicated for cone speakers, ceiling-recessed or suspended baffles are frequently advantageous.
- 4. Acoustically "live" areas generally require lower speaker sound levels.
- 5. Number of speakers will vary with shape of the plan view of the area.

Number of Microphone Cables in Conduit

NUMBER OF CABLES IN CONDUIT	REQUIRED SIZE OF CONDUIT* (INCHES)
1	1/2
2	1/2 or 3/4
3	3/4
4	3/4 or 1
5	1
6	1 1/4
7	1 1/2
8	1 1/2
9	2

HIGH IMPEDANCE
MICROPHONE CABLES —
OUTSIDE DIAMETER = 0.245"

LOW IMPEDANCE
MICROPHONE CABLES —
OUTSIDE DIAMETER = 0.28"
OR 0.231"

*For runs up to 150 ft. with two 45° bends. Plastic outer jacket will pull easier than rubber. Data in the table is approximate; installer should use slightly larger conduit than may seem necessary. Where conduit is already installed and apparently too small, consider use of cables with 0.231" O. D.

Number of Loudspeaker Cables in Conduit

SIZE OF WIRE	REQUIRED SIZE OF CONDUIT (INCHES)										
IN SPEAKER CABLE	1	1 2 3	4	5	5 6	7	8	9	10	20	
(AWG)	pr.	pr.	pr.	pr.	pr.	pr.	pr.	pr.	pr.	pr.	pr.
20	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	1	1
18	1/2	1/2	1/2	1/2	3/4	3/4	1	1	1	1 1/4	11/
16	1/2	1/2	1/2	3/4	3/4	1	1	1	1	1 1/4	14
14	1/2	1/2	3/4	1	1	1 1/4	11/4	1 1/4	11/4	1 1/2	2

NOTE: This table contains recommended sizes of conduit, based on the use of unshielded single twisted pairs of solid or stranded, rubber or plastic insulated conductors. This table is only an approximate guide; conduit length and number of bends should be carefully considered.

GENERAL INSTALLATION TIPS

- Never use acid core solder. Rosin core solder is recommended.
- Do not attempt to force too many cables through a conduit. Breaks, shorts, or intermittent operation may result.
- Always ground amplifier, console or cabinet rack.
- Do not run speaker and microphone lines in the same conduit.
 Never run either of these in the same conduit with power cables.
- Label speaker cables before pulling through conduits so that identification of each twisted pair is simnlified.
- Do not use ac-type convenience outlets where specially designed microphone connectors are indicated.
- When splicing shielded cable, make certain that shield is continuous and carefully soldered at the joints.
- When soldering conductors with vinyl insulation (to connectors or lugs) avoid excessive heat.
- Audio cables are specially designed and building wire should not be substituted.
- Check with sound specialist from whom equipment is purchased when in doubt as to cable or connector to use.
- When loudspeaker cables are run over very great distances, carefully determine required copper diameter of conductor.

Size of Wire for Loudspeaker Runs

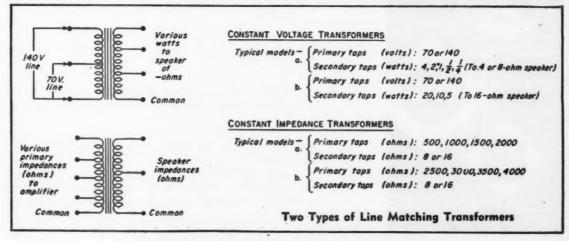
AMPLIFIER OUTPUT TAPS	MAX. LEN	IGTH OF SP	EAKER CABI	LE-FEET (2)
FEEDING SPEAKER HOOKUP (1)	#20 AWG PAIR	#18 AWG PAIR	#16 AWG PAIR	#14 AWG PAIR
500 ohm	1200	2000	3000	4000
250 ohm	700	1100	2000	3000
70 volts (10-watt amplifier)	1200	2000	3000	4000
70 volts (15-watt amplifier)	950	1600	2000	3000
70 volts (30-watt amplifier)	450	750	1200	2000
70 volts (50-watt amplifier)	290	450	750	1200
70 volts (100-watt amplifier)	150	230	360	560
140 volts (50-watt amplifier)	1100	1800	2800	4000
140 volts (100-watt amplifier)	590	950	1600	2000

- The taps to be used will be determined on the basis of the hookup of the line matching transformers for the loudspeakers.
- (2) These maximum lengths are one-way distances from amplifier to line transformer. They are the maximum lengths speaker cables can be run without exceeding 10% power loss (an acceptable loss) in the line.
- NOTE: In the table, the constant voltage amplifier taps are equivalent to impedance values as follows:

70-	volt	tap	on	10-watt	amplifier	=	500	ohm
60	64	63	9.8	15-watt	01	=	333	44
84	8.5	64	8.0	30-watt	64	=	167	84
44	4.6	66		50-watt	44	=	100	64
44	6.6	8.8	44	100-watt		=	50	86
140-	volt	84	**	50-watt	44	=	400	44
140-	volt	44		100-watt	8.6	=	200	44

DEFINITIONS OF TERMS USED IN SOUND WORK

ACOUSTICS	The auditory characteristics of a room resulting from the production, transmission, reception or effects of sound within it.
ACOUSTIC FEEDBACK	The transfer of sound from the loudspeaker back into the microphone in such a manner as to create an annoying squeal or howl.
ACOUSTIC TREATMENT	The use of special sound absorbing material to reduce echos and to control reverberation.
AMPLIFIER	In a sound system this usually refers to a device of electronic components used to strengthen the originating signal from a microphone or record player to the point where it will operate loudspeakers.
BAFFLE	Most commonly used synonymously with loudspeaker housing and may be a suspended, or surface or recessed, ceiling or wall mounting device made of wood, plastic or metal, in which a loudspeaker is housed.
BOOSTER AMPLIFIER	An amplifier designed to boost the level of a signal from a pre-amplifier to provide power for driving loudspeakers.
DECIBEL	A unit used to measure the relative loudness of sound. Engineers employ the complex term also to designate power or voltage ratios.
GAIN	Usually expressed in decibels, this term is applied to indicate the increase in voltage or power output over the voltage or power input.
HIGH IMPEDANCE	Literally the total opposition that a circuit offers to the flow of alternating current. Primarily used in the sound field as an important characteristic of amplifiers, microphones and accessories.
LOSS	A term usually expressed in decibels to indicate the decrease of voltage or power output from voltage or power input.
LOW IMPEDANCE	See High Impedance. Usually applies to 500 ohms or less.
MICROPHONE	A device which converts sound waves into corresponding audio-frequency electrical energy.
MIXER	Usually a pre-amplifier which permits several microphones, record player and/or radio tuner to be combined through volume controls. The suitably mixed signal is then usually fed to the input of a booster amplifier.
MONITOR LOUDSPEAKER	A small loudspeaker mounted in a console or cabinet rack (or adjacent to these) which provides an audible indication of the sound level of the system and which permits preliminary adjustment of the amplifier output before distribution to remote loudspeakers.
PRE-AMPLIFIER	Frequently used synonymously with mixer, although it may be designed to provide for increasing the level of only one input signal.
REPRODUCER	The cartridge mounted in the tone arm which tracks the record grooves by means of a stylus (needle), picking up the electrical signal equivalent of the music or sound which was recorded.
VOLUME LEVEL INDICATOR	A device (meter, neon bulb, etc.) which permits the operator of a sound system to determine visually the sound level output. Usually incorporated in consoles, cabinet racks and pre-amplifiers.



COMPANY & TRADE NAMES



Alphabetical listing of company names, trade names and addresses

The following listing contains

- 1 Company names, with complete addresses.
- 2 Company trade names, in capital letters for easy reference.
- 3 Other names by which companies may be or may have been known, cross-referenced to present company.

All addresses listed were reported by manufacturers as being correct as of 1958.

Trade names are listed solely on the basis of information supplied by the manufacturer and are not guaranteed to be registered or the exclusive property of the manufacturer concerned.

A-B.—Alien-Bradley Co A.B.C.—Columbia Cable & Electric Corp A C Transformer Corp 89 Madison St. Mewark NJ ACCO—Page Steel & Wire Div American Chain & Cable A.B.C.—Columbia Cable & Electric Corp
A C Transformer Corp 89 Madison St Newark NJ
ACCO—Page Steel & Wire Div American Chain & Cable
Co Inc
A-C-E—Arro Expansion Bolt Co
ACL—American Colis Co
ACW—American Celes Co
ACW—American Celes Co
AFCO—Alhambra Foundry Co Ltd
AG—Farrelloy Company
A.G.A. Div Elastic Stop Nut Corp of America
1027
Newark Ave Elizabeth NJ
AH—Arrow-Hart & Hegeman Electric Co
A.J.F. Industries Inc—see Atlantic Transformer Div
New London Instrument Co Inc
A-L-K Co—see Alkco Mfg Co
A-I-F. Steel Condon Instrument Co Inc
A-L-K Co—see Alkco Mfg Co
API—Assembly Products Inc
A-PAM—Automatic and Precision Mfg Co
A.S—Allen-Stevens Conduit Fittings Corp
A-S—All-Steel Equipment Inc
ASMC—Farrelloy Company
ATI—Alexander-Tagg Industries Inc
ATC—Automatic Timing & Controls Inc
A.W.H. Co.—see Haydon (A W) Co
A-Z—Plastic Wire & Cable Corp
ABOGLAS—Natvar Corp
ABOGLAS—Natvar Corp
ABOGLAS—Natvar Corp
ABRA-S-SAW—Collins Machinery Corp
ABRS-M-SHOCK—Federal Shock Mount Corp Mich
Abrams Lighting 3432 Market St Phila 4 Pa
ABSORB-A-SHOCK—Federal Shock Mount Corp
ACCENT—Faires Lamp Div General Lamps Mfg Corp
ACCOLITE—Accurate Insulated Wire Corp
ACCORDION—Pullman Vacuum Cleaner Corp
ACCPRENE—Accurate Insulated Wire Corp
ACCTHERM—Accurate Insulated Wire Corp
Accurate Engineering Co 2005 Blue Island Ave Chlerand 8 IIII Accurate Engineering Co 2005 Blue Island Ave Chicago 8 III
Accurate Insulated Wire Corp 25 Fox St. New Haven 13 Conn
Accurate Manufacturing Co Inc 6 Hepworth Place Garfield NJ
ACCWIRE.—Accurate Insulated Wire Corp
ACE—Armature Coil Equipment Inc
ACE—Pere Inc
Ace Lighting Products Co 230 Eugenia St. S. W.
Atlanta 3 Ga.
ACHESON.—National Carbon Co.
ACID-CAUSTIGBOND—Wilbur & Williams Co.
Ackerman-Johnson Co. 625 W Jackson Blvd. Chicago 6
III. TH III
ACMS—do-Operative Utilities Co Inc
ACME—McCaffrey Mfg & Supply Co
Acme Electric Corp 36 Water St Cuba NY
Acme Electric Corp 36 Water St Cuba NY
Acme Electric Heating Co 1217 Washington St Boston
18 Mass
Acme Fire Alarm Company Inc 106 Seventh Ave New
York 11 NY
Acme Industries Inc 620 N Mechanic St Jackson
Mich YOW 11 NY
Acme Industries Inc 620 N Mechanic St Jackson Milch
Milch Calif Acme Lighting & Mfg Co 949 E 31 St Los Angeles
11 Calif Acme Lite Products Co Congers NY
Acme Manufacturing & Gasket Co 738-40 North 41
St Philadelphia 4 Pa Pa Chem Steel Co 135th St & Perry Ave Chicago 27
III Acorn Insulated Wire Co 36 Freeman St Pawtucket RI Acoustica Associates Inc 26 Windsor Ave Mineola NY ACOUSTILITE—Neo Ray Products Inc Acra Electric Corp 9901 Pacific Ave Franklin Park III
Acra Industrial Electric Co—see Acra Electric Corp
ACRATROL—Counter & Control Corp
ACRAWATT—Acra Electric Corp
ACRI-LUMINUS—Luminous Cellings Inc
ACRO-ETCH—Acromark Co
ACRO-MAGNETIC—Acro Welder Mfg Co
Acro Welder Co
3 Wise Mfg Co 1719 W St Paul Ave Milwaukee
3 Wise Mfg Co
ACRO-Acro Electric Median Co.
3 Wise Mfg Co
ACRO-Acro Electric Median Co. TH 3 Wis
ARROD—Acme Electric Heating Co
ACROM CAST.X.—Acme Electric Heating Co
ACROMM CAST.X.—Acme Electric Heating Co
ACROMARKER.—Acromark Co
ACROMARKER.—Acromark Co
ACROMARTIC—Acro Welder Mfg Co
ACROMATIC—Acro Welder Mfg Co
ACROMATIC—Acro Welder Mfg Co
ACROMATIC—Acro Welder Mfg Co
ACTOGRAF—Newage Industries Inc
ACUSTI LUMINUS—Luminous Ceilings Inc
Adalet Mfg Co
14300 Lorain Ave Cleveland 11 Ohio
Adalot Mfg Co
14300 Lorain Ave Cleveland 11 Ohio
Adalot Mfg Co
Adam Engineering Co
Adam (Frank) Electric Co
3647 Windsor P! St
Louis M6 Louis Mo
Adams Engineering Co 31711 Solon Rd Solon Ohlo
Adams Engineering Co 31711 Solon Rd Solon Ohlo
Adams Engineering Co 31711 Solon Rd Solon Ohlo
ADAPT ALL—Beckley Electric Co Inc
ADAPTA-5TUP—Tomic Sales & Engineering Co
ADAPTABEL—Edwards Company Inc
ADAPTAL—Triangle Company Inc
ADAPTAL—Triangle Conduit & Cable Co Inc
ADAPTAL—Triangle Company Inc
ADAPTAL=Co 325 W Huron St Chicago 10 III
ADD-A-BREAKER—Westinghouse Electric Corp
ADD-A-POINT—Warna Co
ADD-A-TIER—Bernard-Franklin Co Inc
ADD-A-INIT—Bionder-Tongue Laboratories Inc
ADDA-SINIT—Bionder-Tongue Laboratories Inc
ADDA-SINIT—Graph Conduit Company
& Mfg Co

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on oe nADDAPLUG—Associated Engineering Corp
ADJUST-ANGLE—Weksler Instrument Corp
Adjusto Post Mig Co 908 St Clair St Akron 7 Ohio
ADJUSTA-PULLEY—Watteredge Co
Adjustable Fixture Co 104 East Mason St Milwaukee
2 Wisconsini
ADJUSTAT—Smith-Gates Corp
ADJUSTO DECK—Haertel (Walter) Co
ADJUSTO-SLIDE—American Pulley Co
ADJUSTO-SLIDE—American Pulley Co
ADJUSTO-MM—Ward Leonard Electric Co
Adre Co 8980 W Hawthorne Lane Hales Corners 3
Wis AGRE CO SYBU W Hawkhorne Lane Hailes Corners 3 Will ADVAN-GUARD—Advance Transformer Co ADVANCE—Eigin National Watch Co Electronics Div Advance Transformer Co 2950 N Western Ave Chicago 18 III Aemco Inc 10 State St Mankato Minn AERO—American District Telegraph Co AERO-FAN—Pryne & Co Inc Aero Instrument Company 11423 Vanowen St North Hollywood California AERO MAGNETTE—Heinemann Electric Co AERODYNE—Jeffrey Mfg Co AEROLYTE—Lightolier Inc AEROMAC—Seely Instrument Co Inc AEROWACA—AGA Div Elastic Stop Nut Corp of America AGASTAT—AGA Div Elastic Stop Nut Corp of America America
AGLITES—Guth (Edwin F) Co
Ahlberg Bearing Co 3025 West 47th St Chicago 32 Ainsworth Lighting Inc 38-10 Twenty Ninth St LIC AIR-CONTROL—Hastings Air Conditioning Co Inc Air Controls Inc 2310 Superior Ave Cleveland 14 Ohio
AIR DUX—Illumitronic Engineering
AIR FLOW—Matthews Electric Heater Mfg Co
AIR-LINE—Brown-Brockmeyer Co
AIR-LINE—Brown-Brockmeyer Co
Air Marine Motors Inc 369 Bay View Ave Amityville NY
AIR MOVER—Mine Safety Appliances Co
Air & Refrigeration Corp 439 Madison Ave New
York NY York NY
AIR WAVE—Trade-Wind Motorfans Inc
AIR X PELER—Ammerman Co Inc
Aircraft Marine Products Inc—see AMP Inc
Aircraft Specialties Inc 415 Howard St Milch AIRE-RECTIFIER—Larco Inc AirEan Engineering Co 7401 Telegraph Rd Los Angeles 22 Calif AIRMASTER—Haertel (Walter) Co AIRSEAL—Kearney (James R) Corp Airserco Mfg Co Inc 435 Melwood St Pittsburgh 13 Airserco Mfg Co Inc 435 Melwood St Pittsburgh 13
Pa
Airtemp Div Chrysler Corp 1600 Webster St Dayton 1 Ohio
AJAX—Security Insert Co
AJAX—Sherwin-Williams Co
AJAX—Sherwin-Williams Co
AJAX—Sherwin-Williams Co
AJAX—Sherwin-Williams Co
AJAX—Sherwin-Williams Co
AJAX—HUTGREN—AJAX Electric Co Inc
AJAX-MORTHRUP—AJAX Electrothermic Corp
AJJAX-HULTGREN—AJAX Electric Co
AJUSCO-LOC—Adjustable Fixture Co
AJUSCO-EDED—AJIIS (Louis) Co
AKRA-OHM—Shallcross Mfg Co
AI Audio Engineers—see O'Brien Electric Corp
ALABAX—Pass & Seymour Inc
ALADDIN—New England Carbide Tool Co Inc
ALBAL-LITE—Corning Glass Works
ALBANY—Cook's (Adam) Sons Inc
Albartson & Co Inc 3100 Lowell
Alcar Instruments Inc 17 Industrial Ave Little Ferry
AJJ
ALCO—Aluminum Company of America NJ
ALCOA—Aluminum Company of America
ALKANEX—General Electric Co
ALDUTI—S & C Electric Company
ALEXALL—Boston Woven Hose & Rubber Co
Alexander-Tagg Industries Inc Jacksonville Road at
Summit Ave Hatboro Pa
Alexander-Towle Industries—see Alexander-Tagg Indus-Alexander-Towle Industries—see Alexander-Tagg Industries Inc
ALGCO—Auburn Manufacturing Co
Alhambra Foundry Co Ltd 1147 Meridian Ave Alhambra Calif
ALISCO—Allen Iron & Steel Co
AlkANEX—General Electric Co
Alko Mfg Co 4242 N Lincoln Ave Chicago 18 III
ALL BEAR—Bell Electric Co
ALL-BRITE—Fluorescent Fixtures of California
All-Brite Light Co 400 S 12 St Reading Pa
ALL-IN-ONE—Beckley Electric Co Inc
ALL-IN-ONE—Beckley Electric Co Inc
ALL-MOTOR—Falk Corp
ALL PURPOSE—Industrial Electrical Works
ALL SQUARE—Guth (Edwin F)
All-State Welding Alloys Co Inc 249-55 Ferris Ave All-State Welding Alloys Co Inc 249-55 Ferris Ave White Plains NY White Plains AT
All-Steel Equipment Inc Aurora Illinols
ALL-VISION—Mine Safety Appliances Co
ALL WEATHER—Michigan Fluorescent Light Div
ALL-WEATHER HI-LITE—Duro-Test Corp ALLADIN-Metalcraft Products Co Inc ALLEN-Excel Electric Service Co Inc ALLEN-Lint (Clyde W) Allen (L B) Co Inc 5624 N Newark at Bryn Mawr Chicago 31 III no 2024 N rewark at byn mawr Chicago 31 III Allen-Bradley Company 136 West Greenfield Ave Mil-wauke 4 Wisconsin Allen Cooler & Ventilator Inc 704 Woodward St Rochester Mich

Alien Electric and Equipment Co 2101-2117 N Pitcher St Kalamazoo Mich Alien Iron & Steel Co P O Box 550 Norristown Pa Alien-Stevens Conduit Fittings Co 33-53 62nd St Woodside 77 NY Alien Ventilation Div Production Planning Co—see Alien Cooler & Ventilator Inc Alliance Mfg Co Lake Park Blvd Alliance Ohio Allied Industries Inc P O Box 119 Ogaliala Neb Allied Lightning Protection—see Security Mfg & Contracting Co Salied Mfg & Sales Co 3101 W Grand Ave Chicago 22 111 III 22 III
Allied Precision Industries 425 Stevens St (P 0 Box 149) Geneva III
ALLIGATOR—Porcelain Products Inc
ALLIGATOR JAW—Anderson (Albert & JM) Mfg Co
Allis (Louis) Co 427 E Stewart St Milwaukee 1 Allis (Louis) Co 427 E Stewart St Milwaukee 1 Wis Allis-Chalmers Manufacturing Co 930 South 70 St Milwaukee 1 Wis Allis-Chalmers Manufacturing Co 930 South 70 St Milwaukee 1 Wis Almo Mfg Co 119 Sussex Ave Newark 3 NJ Almor Instrument & Pyrometer Co—see Illinois Testing Laboratories Inc Alpha Metals Inc 56 Water St P 0 Box 34 Bergen Station Jersey City 4 NJ Alphaduct Wire & Cable Co 25 Van Dyke Ave (P 0 Box 709) New Brunswick NJ ALTERNARC—Electric Arc Inc ALUMALET—Killark Electric Mig Co ALUMALLOY—Killark Electric Mig Co ALUMALLOY—Killark Electric Mig Co Inc ALUMALET—CHIch (Phil) Fan Mfg Co Inc ALUMANETS—MCPhilben Mfg Co Inc Aluminum Company of America 1501 Alcoa Bidg Pittsburgh 19 Pennsylvania ALUMINUM-GRIP—Preformed Line Products Co ALUMNINOME—Globe Lighting Products Co ALUMNINOME—Globe Lighting Products Corp AMACO—Associated Manufacturers & Distributors Corp AMACO—American Electric Cable Co -American Solder & Flux Co Amco Mfg Co 119 Braintree St Boston 34 Mass AMCOLENS—Art Metal Co AMER PLASTIC—American Electric Cable Co AMERAP—American Electric Cable Co
AMERAP—American Electric Cable Co
AMERICAN BEAUTY—American Electrical Heater Co
American Blower Div of American-Standard Detroit 32
Mich Mich
American Blower Corp—see American Blower
American Brass Co American Metal Hose Div P O
Box 791 Waterbury 20 Conn
American Chain & Cable Co Inc American Cable Div
271 S Pennsylvania Ave Wilkes-Barre Pa
American Coach & Body Co—see McCabe-Powers Body
Co
American Coale Co. Body Co American Coils Co Route 524 Lakewood Rd Farm-American Coils Co Route 524 Lakewood Rd Farmingdale NJ
American Coolair Corp 3604 Mayflower St (P 0 Box 2300) Jacksonville 3 Fla
American Creosote Works Inc 1305 Dublin St (Box 4008) New Orleans 18 La
American Crossum & Conduit Co 7726 Sheridan Rd
Chicago 26 Illinois
American Electric Cable Co 181 Appleton St Holyoke
Mass
American Electric Motors Inc—see American Electronics American Electric Motors Inc-see American Electronics Inc
merican Electric Switch Corp—see American Electric
Switch Div Clark Controller Co
merican Electric Switch Div Clark Controller Co
1146 E 152 St Cleveland 10 Onio
merican Electrical Heater Co 6110 Cass Ave Detroit
2 Michigan Commission Commission Electronics 2 Michigan American Electronic Mfg Inc—see American Electronics American Electronics Inc 6-55 W Washington Blvd Los Angeles 15 Calif American Engineering Co St Philadelphia 37 Pa American Engineering Co St Philadelphia 37 Pa American Floor Surfacing Machine Co—see American Floor Machine Co—see A Merican Gas Accumulator Co—see A Div Elastic Stop Nut Corp of America American Insulated Wire Corp 36 Freeman St Pawtucket RI American Insulated Wire Corp Acorn Insulated Wire Co Div—see Acorn Insulated Wire Co American Louver Co 4240 N Sayre Ave Chicago 34 Inc American Relay & Controls Inc—see Ohmite Mfg Co American Sealants Co Hartford 6 Conn American Sentry Inc 84 Bethlehem Pike Philadelphia 18 Pa American Sentry Inc 64 Between Pike Printatelyina 18 Pa American Silver Co Inc Industrial Div 36-07 Prince St Flushing 54 NY American Solder & Flux Co 19th & Willard Sts Phila 40 Pa AMERICAN-STANDARD—American Radiator & Standard Sanitary Corp American Steel & Iron Works 5801 S Lowe Ave Chicago 21 III

American Steel & Wire Div U S Steel Rockefeller
Bidg Cleveland 13 Ohio
AMERICAN-SWISS—Heller Tool Co
American Transom Co Inc—see Security Insert Co
American Transom Co Inc—see Security Insert Co
American Vacuum Co 8100 N Ridgeway Skokie III
AMERRERE—American Insulated Wire Corp
AMERITHERM—American Insulated Wire Corp
AMERITHERM—American Insulated Wire Corp
AMERIT—American Insulated Wire Corp
Co AMERIT—American Insulated Wire Corp
AMERIT—American Insulated Wire Corp
AMERIT—American Insulated Wire Corp
CO AMP—PARE—Electric Machinery Mirg
CO AMP—PARE—Claster-Shawmut Co
Ampere Industries 60 Boston St
Amperite Co Inc 561 Broadway N Y 12 NY
Amplex Corp
III Water St Brooklyn I New York
Amolex Div Chrysler Corp P 0 Box 2718 Detroit 31
Mich
Amolex Mirg Co—see Amplex Div Chrysler Corp Mich
Amplex Mfg Co—see Amplex Div Chrysler Corp
AMPLICALL—Rauland-Borg Corp
AMPLITROL—Thermo Electric Mfg Co
AMPROBE—Pyramid Instrument Corp
AMVAD—Edwards Co Inc
Anaconda Wire & Cable Co 25 Broadway New York
4 New York
ANACONDALOY—Anaconda Wire & Cable Co
ANALAC—Anaconda Wire & Cable Co
ANALAC—Anaconda Wire & Cable Co
ANALAC—Anaconda Wire & Cable Co
ANACONDALOY—Anaconda Wire & C Anchor Packing Co 401 N Broad St Philadelphia 8 Pa nderson (Albert & JM) Mfg Co 289 A St Boston 10 Mass nderson Electric Corp P 0 Drawer 2151 Birming-ANDERSON EIECTRC CORP P O DIAMET 25.2 DIMMINISHAM 1 AI ANHYDREX—Simplex Wire & Cable Co ANHYDROPRENE—Simplex Wire & Cable Co ANKOREE—Anchor Packing Co ANKORITE—Anchor Packing Co ANKORITE—Ansonia Wire & Cable Co Annis (R B) Co 1101 N Delaware St Indiannapolis 2 Ind

Ind

ANNUVERSARY—Curtis Lighting Inc

ANNUVERSARY—Curtis Decorating Co

ANNUVERSETTE—Edwards Co Inc

ANVILARE—Metals & Thermit Corp

Ansonia Electrical Co—see Ansonia Wire & Cable Co

Ansonia Wire & Cable Co 111 Martin St Ashton RI

ANTENAPLEX—Radio Corp of Annerica

ANTENSIFIER—Blonder-Tonque Laboratories Inc

Anthony (M) Co 773 University Ave Berkeley 10

Calif (M) Co 773 University Ave Berkeley 10

ANTI-ARC—Palmus Fination 6 Appleton Electric Co 1701-1759 Wellington Ave Chicago 13 Illinois Appleton Rubber Co Inc 57 Cornwall St Boston 30 Massachusetts AQUA-SORBER—Walton Laboratories Inc AQUA-SORBER—Walton Laboratories Inc AQUA-SORBER—County Lighting Products Inc AQUASORBER—Urco Products Inc AQUASORB—Turco Products Inc AQUASORB—Turco Products Inc AQUATHENE—General Cable Corp AQUATHENE—General Cable Corp ARC-ESCENT—Luxor Lighting Products Inc Arco Mfg Co 1701 13th Ave North (Box 817) Grand Forks ND Arco Mrg Co 1701 15th Ave North (Box 817) Grand Forks ND
Forks ND
Arco Mrg Co 1701 15th Ave North (Box 817) Grand Forks ND
Arco WAND—American Vacuum Co
AREALUX—Lighting Products Inc
Arex Co 612 N Michigan Ave Chicago 11 III
AREX-AUSTOR—Arex Company
Argo Products Co 1008 N 22 St St Louis 6 Mo
Argo Sales Co—see Argo Products Co Inc
Aries Laboratories Inc 45-33 Davis St Long Island
City 1 N
ARISTOLITE—Guth (Edwin F) Company
ARISTOLITE—Guth (Edwin F) Company
ARITEMP—Aries Laboratories Inc
Arjac Products Inc 55-59 Halstead St Rochester
10 NY
Ark-Les Switch Carp 51 Water St Watertown 72
Massachusetts
Fuse & Manufacturing Co 10 NY
Arc-Les Switch Corp 51 Water St Watertown 72
Massachusetts
ARKESS—Economy Fuse & Manufacturing Co
ARKITTE—Crouse-Hinds Co
Arlawcx Mfg Co—see Radionic Transformer Co
ARMAKOTE—Hatfield Wire and Cable Div
Armature Coil Equipment Inc 2605 Vega Av Cleveland 13 Ohio
APMATIBO—Johns-Manwille Mand 13 Ohio

ARMATURO—Johns-Manville

ARMITE—Shalding Fibre Company Inc

ARMOL-LOK—Phelps Dodge Copper Products Corp

Armstrong Barya & Co 5366 Northwest Highway Chicago 30 III

ARMSTRONG-RIDGEPORT—Capewell Mfg Co

Armstrong Bros Tool Co 5200 W Armstrong

Chicago 30 III

ARRO-CORE—Arro Expansion Bolt Co

Arro Expansion Bolt Co P 0 Box 388 Marion

Ohio

ARROF-LUTE—Arro Expansion Bolt Co

Arrolet Corp Foot of Bower St Montgomery Pennsylvania sylvania
ARROVAL—Arrolet Corp
Arrow Conduit & Fittings Corp 129 30th St Brooklyn
Brooklyn
Fleetric 32 NY
Arrow Electric—see Arrow-Hart & Hegeman Electric
Co Arrow Fastener Co Inc 1 Junius St Brooklyn 12 NY

Arrow-Hart & Hegeman Electric Co 103 Hawthorn St Hartford 6 Conn Arrow Lamps Inc 1270 Broadway New York 1 NY Arsco Mfg & Sales Corp 451 Tenth Ave New York 18 NY Art Metal Co 1814 East 40th St Cleveland 3 Ohio Art Specialty Co 3720 N Milwaukee Ave Chicago 41 Artcraft Fluorescent Corp—see Artcraft Lighting Co Inc Artcraft Lighting Co Inc 248 McKibben St Brooklyn ARCTIC—Yardney Electric Corp Artistic Lamp Mfg Co Inc 401 Fourth Ave N Y 16 Artistic Lamp Mrg Co Inc 401 Fourth Ave N Y 10 NY
Artolier Corp 139 Main St Lodi NJ
Artos Engineering Co 2757 S 28 St Milwaukee Wis
ASARCOLO—Federated Metals Div American Smelting
& Refining Co
ASBESTICA—Johns-Manwille
ASBESTOMENT—Johns-Manwille
ASBESTOMENT—Johns-Manwille
ASBESTOS EBONY—Johns-Manwille
ASCO—Automatic Switch Co
ASCOT—Pollak Luminescent Corp
Associated American Trading Div
Syrkus & Guttman
Inc 750 St Ann's Ave New York 56 NY
Associated Engineering Corp 65 Kent St Brookline
46 Mass
Associated Manufacturers & Distributors Corp 5015 Associated Engineering Corp 55 Kent St Brookline
46 Mass:
Associated Manufacturers & Distributors Corp 5015
S E Haig St Portland 6 Ore
Associated Research Inc 3777 W Belmont Ave Chicago 18 III
ASTRA-LITE—Metalcraft Products Co Inc
Athol Machine & Foundry Co 82 South St Athol Mass
Alkomatic Valve Co Inc 545 W Abbott St Indianapolis Ind Atlantic Engravers Inc 52 Ocean Ave Amityville ntic Transformer Co 5143 N 2nd St Phila 20 Atlantic Transformer Co 5143 N 200 31 Phila acpara
Pa
Atlantic Transformer Corp—see Atlantic Transformer
Div New London Instrument Co Inc
Atlantic Transformer Div New London Instrument Co
Inc 30 Hynes Ave Groton Conn
ATLAS—SKF Industries Inc
ATLAS—AIRE—Atlas Tool & Manufacturing Co
Atlas E-E Corp 47 Prospect St Woburn Mass
Atlas Electric Products Co 319 Ten Eyck St BrookIyn 16 NY
Atlas Electronics Mfg Co—see Atlas E-E Corp
Atlas Overhead Door Co Mill St at Reading Raliroad
Quakertown Pa
Atlas Tack Corp Pleasant & South Sts Fairhaven
Mass Atlas Tack Corp Pleasant & South Sts Fairhaven
Mass
Atlas Tool and Mfg Co 5147 Natural Bridge Ave
St Louis 15 Mo
ATLEE—Atlas E-E Corp
ATLITE—Atlas Electric Products Co
ATMO—Kidde (Walter) & Co Inc
AUBESTON—Auburn Manufacturing Co
Auburn Manufacturing Co Pease Ave & Stack St
Middletown Connection Auburn Manufacturing Co Pease Ave & Stack St Middletown Connecticut Williams of Manufacturing Confection Connecticut Williams of Connecticut Connectic Connecticut CO THE AUTHOTONE—Auth Electric Company Inc AUTO ARC—Auto Arc-Weld Mfg Co Auto Arc-Weld Mfg Co 9615 Meech Ave Cleveland 5 Ohio
Ohio
AUTO-BLOC—Round (David) & Son Inc
Autocali Co 58 Warden Ave Shelby Ohio
AUTOCON—Automatic Control Co
AUTOCON—Westinghous Electric Corp
AUTOPILEX—Universal Metal Hose Co
AutoFixtsop Co 2035 Washington Ave Phila 46 Pa AUTOGAP—Hubbard & Co
Automatic Control Co 995 University Ave St Paul 4
Minn
Automatic Devices Co Inc 714 Hillgrove Ave Western Automatic Devices to Inc. 714 Hillgrove Ave Western Springs III Automatic Electric Co North Lake III Automatic Electric Meater—see Sepco Corp Automatic Electric Mfg Co—see Aemico Inc Automatic & Precision Mfg Co 252 Hawthorne Ave Yonkers S NY
Automatic Switch Co 50-56 Hanover Rd Florham Pk Automatic Transportation Co 101 West 87 St Chicago 20 Illinois
Automatic Vulcanizers Corp 16 Hudson St New York
13 NY 13 NY
Automation Products Inc 3030 Max Roy St Houston 24 Tex
AUTOMATOR—Marathon Electric Mfg Corp
AUTOPHONE—Couch (S H) Co Inc AUTOREG—C & D Batteries Inc AUTOSET—Stromberg Time Corp AUTOSPEED—Stromberg Time Corp AUTOSTATIC—Lake Shore Electric Corp AUTUSTATIC—Lake Shore Electric Corp
Autotron Co 3629 N Vermilion St Danville III
AUTOVALVE—Westinghouse Electric Corp
AUTRASTAT—Ward Leonard Electric Co
AVENARIUS—Carbolineum Wood Preserving Co
Avion Div ACF Industries Inc 11 Park P! Paramus
NJ

B-LINE—Black (M) Manufacturing Ce
BD—Beede Electrical Instrument Co Inc
BFC—Bernard-Franklin Co Inc
BM—Briegel Method Tool Co
B & M Electric Corp 168 7th St Brooklyn 15 NY
BMC—Bowers Mfg Co Inc
BMAD—BMD&R Inc
B M D & R Inc 7020 Walker St St Louis Park
Minneapolis 16 Minn
B-T Labb—see Blonder-Tongue Laboratories Inc
BTC—Berkshire Transformer Corp
BTC—Brewer-Titchener Corp
BTC—Brewer-Titchener Corp
BTC—Burgess Vibrocrafters
B-W Controller Corp 2200 East Maple Rd Birmingham Michigan
SW—General Electric Co Construction Materials Div
BABY-CON—Fanon Electric Co Inc
BADER—Reliance Automatic Lighting Co
Badger Die Casting Corp 201 W Oklahoma Ave Milwauker 7 Wis
Bahnson Company 1001 South Marshall St WinstonSalem North Carolina
Bailey Meter Co 1050 Ivanhoe Rd Cleveland 10 Ohio
BAKER—Baker-Roos Inc 602 W McCarty St Indianapolis 6
Ind
Ind
Balance Engineering Co 5030 W Lake St Chicage Ind
Balance Engineering Co 5030 W Lake St Chicago
44 III
BALCO—Driver (Wilbur B) Co
Baldor Electric Co 4353 Duncan Ave St Louis 10 BALL RITE-CUMMINS Portable Tool Div John Oster Mfg Co BALLOLITE—Line Material Industries BALLYHOO—Simpson (Mark) Mfg Co Inc Ballymore Co Lincoln & Garfield Aves West Chester Pa
BALTRIC—Baldor Electric Co
BANNER-AIRE—Argo Products Co
BANTAM—American Rectifier Corp
BANTAM—Bin-Dicator Co
BANTAM—Small Motors Inc
BANTY—Mercury Manufacturing Co
Bar-Brook Manufacturing Co Inc
BANTY—Mercury Manufacturing Co
Bar-Brook Manufacturing Co Inc
BANTY—Mercury Manufacturing Co
Bar-Brook Manufacturing Co Inc
Barber-Green Co
400 N Highland Ave Aurora III
Barber-Green Co
400 N Highland Ave Aurora III
Barber-Green Co
Mass

MidBarber Electric Mig Co Inc
30 Chestmat St
N Attle
Barbor Mass boro Mass Barkelew Electric Mfg Co 1905 Columbia Ave Middletown Ohio Barkon-Frink Tube Lighting—see Frink Corp Barksdale Valves 5125 Alcoa Ave Los Angeles 58 Gletown Unio.

Barkon-Frink Tube Lighting—see Frink Corp
Barksdale Valves 5125 Alcoa Ave Los Angeles 58
Calif
BARMANCO—Bartlett Mfg Co
BARM-FLEX—Paranite Wire & Cable Div
Barrett Varnish Co 1532 S 50th Ct Cicero 50 III
BARTAP—Burndy Corp
Barth Corp 12650 Brookpark Rd Cleveland 30 Oblearlett Manufacturing Co 3003 East Grand Blvd
Detroit 2 Michigan
BASEDUCT—National Electric Products Corp
Bashlin (W M) Co Bashlin Bldg Grove City Pa
BASIC UNIT—Electro Silv-A-King Corp
BATITERY-SCOPE—Christie Electric Corp
BATITERY-SCOPE—Christie Electric Corp
BATITERY-SCOPE—Christie Electric Corp
BAYLITE—Electro Silv-A-King Corp
BEAUTY TONE—Westinghouse Electric Corp
Beaver Pipe Tools Inc 310 Dana Ave Warren Ohio
Becker Brothers Carbon Co 3450 South Laramie Ave
Cicero 50 Illinois
Beckley Electric Co Inc 468-470 Grand Ave Brooklyn
38 New York
BECO—Westinghouse Electric Corp
BECO—Westinghouse Electric Corp
Bedee Electrical Instrument Co Inc Penacook NH
BELCA—Sprague Electric Company
BECO—Bell Electric Company
BECO—Begue Electric Manufacturing Co
BELCO—Begue Electric Manufacturing Co
BELCO—Begue Electric Manufacturing Co
BELCO—Begue Electric Manufacturing Co
BELCO—Begue Electric Manufacturing Co
Belcon Bell Electric Co 524 Midland Bank Bldg
Bell Lumber & Pole Co 524 Midland Bank Bldg III
Bell Lumber & Pole Co 524 Midland Bank Bldg
Minneapolis 1 Minnesota
Bell Sound Systems Inc 555 Marion Rd Columbus 7 Ohio
Believue Industrial Furnace Co 2620 Crane Ave
Detroit 14 Mich
BELT-AIR—Buffalo Forge Co Benbow Mfg Co-see Insul-8-Corp BENCO-Benjamin Electric Mfg Co BENCO—Benjamin Electric Mfg Co
BENFIELD—Steelduct Co
Benjamin Electric Mfg Co
Seegers Rd Des Plaines III
Benjamin Reel Products Inc. 10700 Broadway Cleveland 25 Ohio
Benson (Alexander R) Co Inc. 2 Davis Rd New Hartford NY
BEPCO—Buchanan Electrical Products Corp
BERALOY—Driver (Wilbur B) Co
Bergen Laboratories 247 Crooks Ave Clifton NJ
Berko Electric Mfg Corp 212-40 Jamaica Ave Queens
Village 28 NY
Berkshire Laboratories 942 Bank Village Greenville
NH Berkshire Transformer Corp Kent Conn Bernard-Franklin Co Inc Hedley & Balfour Sts Phila 37 Pa Seming Machine Co 29 West 35th St New York 1 New Berns Mfg Corp Electric Blower Co Div—see Elec-tric Blower Co Div Berns Mfg Corp Bernz (Otto) Co Inc Driving Park & Ramona Roches-ter 13 MY BERNZ-O-MATIC—Bernz (Otto) Co Inc BERNZRITE—Bernz (Otto) Co Inc Berny (William B) Co 117 Causeway St Boston 14 Mass m (Harvey P) Co 2225 Bogen St Cincinnati BESTO-WIRE—Rhode Island Insulated Wire Co Inc BETA—Wakefield Co Beverly Shear Mfg Co 3004 W 111 St Chicago 43 BI-FLO—Aerovent Fan Co Inc
Biddle (James G) Co 1316 Arch St Phila 7 Pa
Biddle (James G) Co 1316 Arch St Phila 7 Pa
Biddle Trade Publishing Co 2720 Beverly Blvd Los
Angeles 57 Calif
BIERCE—Chance (A B) Co
BIG BEAM—U-C-Lite Manufacturing Co
BIG BEAM—U-C-Lite Manufacturing Co
BIIIlings & Spencer Co 1 Laurel St Hartford 1
Connecticut
BIII-TIN—Thermador Electrical Manufacturing Co
BIII-TIN—Thermador Electrical Manufacturing Co
BIn-Dicator Co 13946 Kercheval Ave Detroit 15
Mich Mich
BIN-EYE—Jeffrey Mfg Co
BIN-YUE—Convair Inc
Bios Laboratories Inc 17 W 60 St New York 23 BIPRENE—Bishop Manufacturing Corp Birdsell Mfg Co Inc 750 San Antonio Rd Pale Alte Calif BISEAL—Bishop Manufacturing Corp -Bishop Manufacturing Corp Manufacturing Corp 10 Canfield Rd Cedar BISEAL—Bishop Manufacturing Corp
Bishop Manufacturing Corp 10 Canfield Rd Cedar
Grove New Jersey
BLACK DIAMOND—Dunton (M W) Co
Black & Decker Mfg Co Towson 4 Maryland
Black (M) Mfg Co 300-08 N Third St Phila 6 Pa
Blackbure (Jasper) Corp 1525 Woodson Rd St Louis
14 Mo
Blackhawk Industries 250 South Main St Dubuque
Towa Blackhawk Mfg Co 5325 W Rogers Milwaukee 46 Wis
Blaco Mfg Co 6541 Euclid Ave Cleveland 3 Ohlo
BLAKE—Couch (S H) Company Inc
BLENDTROL—Jordan Co Inc
BLIMP—Curtis Lighting Inc
Bliss Electronics Corp Sussex NJ
Blitz Electric Co 5713 Wentworth Ave Chicago 21 Wis III
Blonder-Tongue Laboratories Inc 9-25 Alling St
Newark 2 NJ
Blower CL R) Co—see Ripley Co Inc
BLU-RED—Associated American Trading Div
BLUB EBAYER—Cornell-Dubliler Electric Corp
BLUB RRUTE—Worthington Corp
BLUB CANNOND—Whitman & Barnes Div
Blue DIAMOND—Whitman & Barnes Div
Blue M Electric Co 138th & Chatham Sts Blue
Island III Island III
BLUEBONNET—Forston Co
Bodendleck Tool Co P O Box 499 Taylorville III
Bodine Electric Co 2254 West Ohlo St Chicago 12 Bodine Electric Co 2254 West Ohlo St Chicago 12 III
Bogen (David) Co Inc Route 4 & Forest Ave (P 0 8 x 500) Paramus NJ
Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ
BOGND-ROD—Sherman (H B) Mfg Co
BONDEZE—Phelps Dodge Copper Products Corp
Bonney Forge & Tool Works 2400 Rockhill Rd (North)
Alliance Ohlo
Borden Co—see Beaver Pipe Tools Inc
Borden Co—see Beaver Pipe Tools Inc
Borden Engineering Co—see Borden Engineering Div
M J Johnson Aircraft Engineering Co
Bordon Engineering Div M J Johnson Aircraft Engineering Co
Bordon Engineering Div M J Johnson Aircraft Engineering Div
BOROHM—Shallcross Mfg Co
BOROHM—Shallcross Mfg Co
Borthig (George C) Co Inc P 0 Box 115 East Rutheford NJ
BOSS—Huenefeld Co
Boston Gear Works 14 Hayward St Quincy 71 Mass Boston Gear Works 14 Hayward St Quincy 71 Mass Boston Woven Hose & Rubber Co Box 1071 Boston 3 Massachusetts Bound Brook Oil-Less Bearing Co Bound Brook NJ Bowers Mfg Co Inc 6700 Avalon Blvd Los Angeles 3 Calif DOX-LOK—Metalectrics Inc Brach (L.S) Mfg Co—see Brach Mfg Corp Brach Mfg Corp 200 Central Ave Newark 3 NJ Brady (W H) Co 727 W Glendale Ave Milwaukee 12 Brady Milwaukee Co-see Brady (W H) Co Brand (William) & Co Inc 51 North St Willimantic Brand (William) & Co Inc 51 North St Willimantic Conn
Brand Dielectrics 57 North St Willimantic Conn
Brandam Mareck & Duepner Inc—see B M D & R Inc
BRASCOLITE—Guth (Edwin F) Co
BRAZECLAD—Armerican Silver Co Inc
BREEZ-ALL—Robbins & Myers Inc
BREEZ-ALL—Robbins & Myers Inc
BREEZ-DayBraid Forge Co
Breuer Electric Mfg Co 5100 North Ravenswood Ave
Chicago 40 Illinois
Bridgeport Hardware Mfg Corp Scofield Ave Bridgeport 5 Conn port 5 Conn
Briegel Method Tool Co 104 Northeast First St Galva
Illinois

Bright Light Reflector Co—see Electro-Silv-A-King Corp Bright Star Industries 600 Getty Ave Clifton NJ

Bristol Motor Div Vocaline Co of America Inc Coulter St Old Saybrook Conn BRITEBEAM—Lightalarms Inc Broan Mfg Co Inc Hartford Wis BRONCO 66—Western Insulated Wire Co BRONCO 66—Western Insulated Wire Co BRONCOBESTON—Western Insulated Wire Co Bronze Bearings Inc 340 N Ave East Cranford NJ Brook Motor Corp 3555 W Peterson Ave Chicago 4 BROOKLYN-Johns-Manville ROOKS-Mine Safety Appliances Co rooks Lumber Co P O Box 153 Bellingham Washington Brown Company 150 Causeway St Boston 14 Mass Brown-Brockmeyer Co 1000 S Smithville Rd Dayton 1 BROWN DEVIL—Ohmite Manufacturing Co Brown Instrument Div Minneapolis-Honeywell Regulator Co—see Minneapolis-Honeywell Regulator Co Indus-Co—see Minneapolis-Honeywell Regulator Co Indus-trial Div Brown Wood Preserving Co 409 Commonwealth Bldg Louisville 2 Ky BROWN-X—Pass & Seymour Inc BROWNING—Potter & Rayfield Inc Brunswick Instruments P 0 Box 813 New Brunswick BRUNT—Parr Mfg Corp
Bryant Electric Co 1421 State St (Box D Barnum Sta)
Bridgeport 2 Connecticut
Bridgeport 2 Connecticut
Bryant Mfg Co 410 N Paulina St Chicago 22 III
BUBBLTROL—Automatic Control Co
Bubanana Electrical Products Corp
22 Hillside NJ
BUCK-BLOKK—Buchanan Electrical Products Corp
Buckles (Chris) Inc 2300 S Springfield Ave Chicago
23 III
BUCKEYE—Voungstown Sheet and Tube Co
BUDGET-LITES—Litecraft Mfg Corp
Buffalo Forge Co 490 Broadway Buffalo 5
Buffalo Machine Mfg Co 586 Tonawanda St Buffalo 7
NY NY
NY
BUFMIL—Republic Metals Co
BUG-A-WAY—Westinghouse Electric Corp
BUG CHASER—Amplex Corp
BUIL CHASER—Amplex Corp
BUILL DGG—Stanley Electric Tools
BUILL-IN-WATCHMAN—Westinghouse Electric Corp
BUILL DGG—Boston Woven Hose & Rubber Co
Buil Dog Electric of Denver—see Young Electric & Mfg
Co Inc
BULL DGG—Mid-States Welder Mfg Co
BULLDOG—Polis Mfg Co
BUILLDGG—Polis Mfg Co
BUILDOG—Folis Mfg Co
BUILDOG—States Welder Mfg Co
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BUILDOG—States Welder Mfg Co
BUILDOG—OI Mfg Co
BUI t 11 Michigan Recording Co W H—see Simplex Time Recorder Bundy Bunnell (G F) Co-see Atlantic Engravers Inc Bunting Brass & Bronze Co 715 Spencer St Toledo 1 Ohio
Burgess Vibrocrafters Inc Grayslake III
Burling Instrument Co Inc 16 River Rd Chatham NJ
Burndy Engineering Co-see Burndy Corp
Burndy Corp Norwalk Com
Burnley Battery & Manufacturing Co 103 Clay St Box
511 North East Pennsylvania
BURLINGTON-Miller Co
Burns (James F) Co 705-715 Cherry St Philadelphia
6 Pa
6 Pa Ohio 6 Pa Burr Aluminum Products Div—see Keyes-Davis Co Burt Mfg Co 936S High St Akron 11 Ohio Burton Mfg Co 2520 Colorado Ave Santa Monica Burton Calif Burton-Rogers Co 42 Carleton St Cambridge 42 Mass
Bush Transformer Corp 707 North St Endicott NY
Bush TX Corp—See Bush Transformer Corp
BUSHEND—Buchanan Electrical Products Corp
BUSS—Bussmann Manufacturing Co
Bussmann Mfg Co—see Bussmann Mfg Div McGrawEdison Co
Bussmann Mfg Div McGraw-Edison Co
Jefferson St Louis 7 Mo
BUSTER—Lidseen of North Carolina Inc
BUTTIN—Burndy Corp
BUZABEL—Edwards Company Inc
BUZAGALL—Edwards Company Inc
BUZAGALL—Edwards Company Inc Mass

C & B Engineering and Fabricating Corp P O Box 8701 Houston Tex.
CBC Electronics Go Inc 2601 N Howard St Philadelphia 33 Pa C & C—Christie Electric Corp.
CCA—Coll Company of America Inc C & D Batteries Inc Conshohocken Pennsylvania CDM—Curtis Development. & Mfg Co C & E—Ericson Manufacturing Co CFI—Day-Brite Lighting Inc CGS—Caltron Products Co C—CH—Cutler-Hammer Infining Inc C IBOARD—Century Lighting Inc C M—Chicago Miniature Lamp Works CM—Chicago Miniature Lamp Works CM—Chisholm-Moore Hots Corp CNM—Chosholm-Moore Hots Corp CNM—Chicago Pneumatic Tool Co C-Q-T—Chase-Shawmut Company C-RITE—Dependable-Electric Mfg Co Inc C. T. R.—Cincinnati Time Recorder Co CTS—Chicago Telephone Supply Corp CWC Corp.—sec Crozier Machine Tool Co CABBRICOID—American Electric Cable Co CABINETROL—General Electric Co Apparatus Sales Div

Cable Electric Products Inc 234 Daboll St Provi-Cable Electric Products Inc 234 Daboll St Providence 7 Rhode Island
CABLEMATIC—Wil-Son Mfg Co
CABLERACK—Chalfant Products Co Inc
CABLERACK—Chalfant Products Co Inc
CABLERACH—Chalfant Products Co Inc
CABLERACH—Chalfant Products Co Inc
CABLEX—Collyer Insulated Wire Co
CABLEX—Collyer Insulated Wire Co
CADDY—Erico Products Inc
CADET—Guth (Edwin F) Company
CADILLAC—Clements Mfg Co
CADILLAC—Waveland Electric Co
CADWELD—Erico Products Inc
CAL-MATIC—Morth Shore Nameplate Inc
CAL-MATIC—Morth Shore Nameplate Inc
CALCULITES—Lightolier Inc
Califone Corp 1041 N Sycamore Ave
Calif Califone Corp California Reinforced Plastics Co-see Hexcal Products Cannon Electric Co
Co
CAPAC—Engelhard (Charles) Inc
CAPACOHMETER—Simpson Electric Co
CAPCO—Capitol Stage Lighting Co Inc
CAPCOLITE—Capitol Stage Lighting Co
Capewell Mfg Co 60-70 Governor St is Conn
CAPILLARY—Air & Refrigeration Corp
Capitol Hardware Mfg Co Inc 400 N Leavitt St Chicago III
Capitol Stage Lighting Co Inc 527 W 45 St New
York 36 NV
CAPRI—Benjamin Electric Mfg Co
CAPRI—Frigid Inc
CAPRI—Svivelier Co Inc
CAPRI—Svivelier Co Inc
CAPRI—Mfg Co 2565 W Fullerton Ave Chicago 47
III Hartford 2 Capson Mfg Co 2565 W Fullerton Ave Chicago 47 III
CARBI-TWIST—U S Expansion Bolt Co Carboline Co 32 Hanley Industrial Ct St Louis 17 Mo Carboline mw Wood Preserving Co 6683 N 40 St Milwaukee Wis CARBOLDN—Carbone Corp Carboloy Dept General Electric Co—see General Electric Co Chemical & Metallurgical Div Magnetic Materials Sec CARBOLUBE—Carbone Corp CARBOLUBE—Carbone Corp CARBOMITE—Continental Carbon Carbon Engineering Corp P 0 Box 236 Slinger Wis Carbone Corp 400 Myrtle Ave Boonton New Jersey CARDINAL—Quality Tools Corp CARGULTES—Steber Mfg Co Carlile & Dougherty Inc—see C & D Batteries Inc CARLTON—Hudson Lamp Co Carney (B J) & Co 411 Peyton Bldg Spokane 8 Wash Carol Cable Co 190 Middle St Pawtucket RI CAROPREME—Carol Cable Co Carpenter Mfg Co 2250 Bradiey St Somerville 45 Mass Carrier Corp Carrier Parkway Syracuse 1 NY CARBON—Hidsh Carbone Company Carbone Company Carbone Carbone Carrier Parkway Syracuse 1 NY CARBON—Hidsh Development Carbone Car Mass
Carrier Corp Carrier Parkway Syracuse 1 NY
CARRO—United Pressed Products Co
Carron Mfg Co-see United Pressed Products Co
CARRYABLE—Homelite Div Textron Inc
Carter Co R L—see Stanley Electric Tool
Carter Motor Co 2711 W George St Chicago 18 III
CARTRIJ-DRY—Pyramid Electric Co
CAST-OHM—Shalicross Mfg Co
CASTOMATIC—Federated Metals Div American Smelting & Refning Co
CATALINA—Industrial Lamp Corp
CATALINA—Swivelier Co Inc
CATARACT—Ajax Electric Co
Catrollilar Tractor Co Engine Div Abinoton & N CATARACI—AJAX ETECTIC CO
Caterpillar Tractor Co Engine Div Abington & N
Perry Sts Peoria III
Cathionics Inc—see Cold Cathode Lighting Corp
Cathodic Protection Service 4601 Stanford St Houston Tex Cavalier Air Conditioning Co—see Forston Cavalier Corp Electric Heating Div 343 W First St Chattaneoga Tenn Ceco Steel Products Corp 5601 W 26 St Chicago 50 III CEETEECO-Crescent Tool Co CEETEECO—Crescent Tool Co
CEFECO—Commercial Enclosed Fuse Co
Ceilheat Div Homes Inc—see Ceilheat Inc
Ceilheat Inc 5212 Homberg Drive Knoxville Tenn
CEILO—Gibson Mfg Co
CEN-TRI-CORE—Alpha Metals Inc
CENTAMATT—Wesix Electric Heater Co
CENTRA-POWER—General Electric Co
Distribution
Assemblish Dace Assemblies Dept
Central Neon Co—see Centralite Co Inc
Central Porcelain Co 507 Railroad St Columbiana Ohio Central Scientific Co 1700 Irving Park Rd Chicago 13

Central Station Signals Inc 53 W 23 St New York 10 NY
Central Transformer Co 900 W Jackson Blvd Chicago
7 III Central Transformer Corp P 0 Box 687 Pine Bluff Arkansas
Centralite Co Inc Dayton & Central Aves Cincinnati 14 Ohio
CENTROL—Nelson Electric Mfg Co
CENTROL—Selson Selectric Mfg Co
CENTURY—Keasby & Mattison Co
Century Electric Co 1806 Pine St St Louis 3
Missouri Century Fan & Ventilator Co 45 Cedar St Stamford Conn
Contract of the Contract waukee I Wisconsin
CHAIN MATE—Radix Wire Co
Chaifant Mfg Co—see Chaifant Products Co Inc
Chaifant Products Co Inc 11525 Madison Ave Cleve-Jand 2 Ohio CHALKBOARD—Solar Light Mfg Co CHALLENGER—Bogen (David) Co Inc CHALLENGER—Coffing Hoist Div Duff-Norton Co CHALLENGER—Curtis Lighting Inc CHAMCO—Chalfant Products Co Inc CHAMPION—Darley (W S) & Co CHAMPION—Turner Brass Works CHAMPION—Turner Brass Works
CHAMPION—Winpower Mfg Co
Champion DeArment Tool Co South Main St Meadville
Pennsylvania Champion DeArment Tool Co South Main St Meadville Pennsylvania Champion Lamp Works 330 Lynnway Lynn Mass Champion Mfg Co—see Winpower Mfg Co Chance (A B) Co 210 N Allen St Centralla Mo Chandeysson Electric Co 4084 Bingham Ave St Louis 16 Mo CHANGE-A-CYCLE—Carter Motor Co CHANGE-A-VOLT—Carter Motor Co CHANNEL-DUCT—Glastic Corp CHANNELITES—Swivelier Co Inc 227 Fulton St New York 7 Napman (P E) Electrical Model Van Chapman (P E) Electrical Van Chapman (P E) Electrical Van Chapman (P E) Electri NY
Chapman (P E) Electrical Works Inc 1820 Chouteau
Ave St Louis 3 Mo
CHARCO—Charleston Rubber Co
CHARGALYZER—Christie Electric Corp
CHARGE-APACK—Electric Service Systems Inc
CHARGE CONTROL—Exide Industrial Div
CHARGE-ONTROL—Exide Industrial Div
CHARGE-ONANTIC—Herner Electric Co
CHARGICATOR—Hickok Electrical Instrument Co
CHARGICATOR—Hickok Electrical Instrument Co CHARGOMATIC 88—Electric Cord Co Charles Machine Works Inc. P O Box 66 Perry Okia Charleston Rubber Co Stark Industrial Park Charles-ton SG CHAPTESTON RUBDET CO STATE INdustrial Park Charleston SC
CHASBESTOS—Chase & Sons Inc
CHASE—Thomas & Betts Co
CHASE—COTE—Chase & Sons Inc
Chase—Shawmut Co 374 Merimac St Newburyport
Massachusets
CHEER LIGHT—Aerolux Lights Corp
Chelsae Fan and Blower Co 639 South Ave Plainfield NJ
Chemalow Fleetpooles Corp. Cillwebie Elaid Sastes Chemaloy Electronics Corp Gillespie Field Samee Chester Cable Corp Oakland Ave Chester NY Chester Hoist Div National Screw & Mfg Co Lisbon Ohio
Chester Mfg Co—see Chester Hoist Div National Screw
& Mfg Co
CHICAGO—Couch (GH) Co Inc
CHICAGO—Klein (Markins) & Sons
CHICAGO—Lidseen of North Carolina Inc
Chicago Blower Corp 9867 Pacific Ave Franklin Park III
Chicago Commutator Inc
Ct Wheeling III
Chicago Decalcomania Co 3310 Elston Ave Chicago
18 III Chicago Decalcomania Co 3310 Eliston Ave Chicago
18 III
Chicago Die Casting Mfg Co 2510-14 W Monroe St
Chicago 12 III
Chicago Metal Hose Corp—see Flexonics Corp
Chicago Miniature Lamp Works 1500 N Ogden Ave
Chicago 10 III
Chicago Pneumatic Tool Co 6 East 44th St New
York 17 New York
Chicago Philip & Braiding Co—see Flexonics Corp
Chicago Tobling & Braiding Co—see Flexonics Corp
Chicago Wire Iron & Brass Works 2411 W Belmont
Ave Chicago III III
CHIEF—Collins Machinery Corp
CHILCO—Chicago Miniature Lamp Works
CHIMALAK—Dolph (John C) Co
Chisholm-Moore Hoist Corp—see Chisholm-Moore Hoist Corp—see Chisholm-Moore Hoist Div Columbus McKinnon Chain Corp
Chisholm-Moore Hoist Div Columbus McKinnon Chain Corp
Chisholm-Moore Hoist Div Columbus McKinnon Chain Corp
CHIDROLUX—Luxor Lighting Products Inc CHLOREXTOL—Allis-Chalmers Manufacturing Co
CMLOROLUX—Lixxov Lighting Products Inc
CMORDETTE—Edwards Company Inc
CMORE BOY—Allis-Chalmers Mfg Co
Christle Electric Corp 3410 W 67 St Los Angeles
43 Calif
CHROMALOX—Wiegand (Edwin L) Co
Chromalox Inc—see Wiegand (Edwin L) Co
CHROMASTER—Ward Leonard Electric Co
CHROMESTER—Ward Leonard Electric Co

CHRONO-SPRAY—Paragon Electric Co
CHRONO-TEMP—Paragon Electric Co
CHRONO-TEMP—Paragon Electric Co
CHRONO-TEMP—Paragon Electric Co
CHOUX—Buck Mfg Co
CINCH—National Lead Company
Cincinnati Time Recorder Co 1733 Central Ave Cincincintin Inc—see Hasco Electric Corp
CIRCLAC—Westinghouse Electric Corp
CIRCLAC—Westinghouse Electric Corp Lamp Div
Circle Air Industries Inc 244 Herkimer St Brooklyn
16 NY
Circle D Mfg Co—see Natale Machine & Tool Co
Circle D Mfg Co—see Natale Machine & Tool Co
Circle D Mfg Co—see Natale Machine & Tool Co
Circle D Mfg Co—see Natale Machine & Tool Co
Circle D—Lee Lectric Fittings Co
Circle L—Lew Electric Fittings Co
Circle L—Lew Electric Fittings Co
Circle LUX—Pfaff & Kendail
CIRCLENDD—Circle Wire and Cable Corp
CIRCLELUX—Pfaff & Kendail
CIRCLEUX—Pfaff & Kendail
CIRCLEUX—Pfaff & Co
CIRCLOC—Circle Wire and Cable Corp
CIRCLENC—Sun-Lite Mfg Co
CIRCLOC—Circle Wire and Cable Corp
CIRCLOC—Circle Wire and Cable Corp
CIRCUITROL—Continental Electric Equipment Co
CIRCULAC—Ailso Company Inc
CIRCULLAC—Ailso Company Inc
CIRCULLAC—Garcy Lighting Div
CIRFLEX—Circle Wire and Cable Corp
CIRCUITRO—Circle Wire and Cable Corp
CIRCUITRO—Circle Wire and Cable Corp
CIRCULAC—Folic Circle Wire and Cable Corp
CIRTUF—Circle Wire and Cable Corp
CIRTURAC Clark Controller Co 1146 E 152 St Cleveland 10 Ohlo
Clark-Cooper Co Inc 317 N Market St Palmyra NJ
Clauss Cutlery Co Fremont Ohlo
CLEAN-FLO—Allis (Louis) Co
Clean Sweep Co 6534½ Whittier Bivd Los Angeles
22 Calif
CLEAR-SELE—Rest-Oleum Corp
CLEARSTYE—Economy Fuse & Manufacturing Co
CLEMATIC—Cleveland Electric Motor Co
Clements Mfg Co 6650 South Narragansett Ave Chicaeo 38 Illinois
Cleveland Electric Motor Co 5213 Chester Ave Cleveland Since Company Fuse & Company Fuse C Cleveland Switshboard Co 2925 E 79 St Cleveland 4 Cleveland Trencher Co 20100 St Clair Ave Cleveland 17 Ohio CLICK-ON-Electrical Fittings Corp CLIFTALL-Clifton Conduit Corp Clifton Conduit Corp 3300 Eastbourne Ave Baltimore CLICK-ON—Electrical Fittings Gorp
CLIFTALL—Clifton Conduit Corp
Clifton Conduit Corp
24 Md
Clifton Mfg Co Inc Mattapan Boston 26 Mass
CLIFTX—Clifton Conduit Corp
CLIMATE CHANGER—Trane Co
CLIPPER—Trade-Wind Motorians Inc
CLIPPER—Walker Brothers
CLIPPTITE—Economy Fuse and Mfg Co
CLOSTEN LITE—Evere Electric Co
CLOSTED BACK—U S Expansion Bolt Co
CLUSTER LITE—COCO CO
CLUSTER LITE—COCO CO
CLUSTER LITE—COCO CO
CO—MO-TROIL—Weltronic Co
CO—MO-TROIL—Weltronic Co
Coates Electric Mfg Co
Coates Elec Coates Electric Mfg Co 34.19-1.1th Ave S W Seattle 4
Wash
COAXIAL—Marion Electrical Instrument Co
COBANIC—Driver (Wilbur B) Co
COBENIUM—Driver (Wilbur B) Co
COCO—Coil Company of America Inc
CODE-CALL—Wheelock Signals Inc
CODE-CALL—Wheelock Signals Inc
Code Development Co—see Code Equipment Sales Co
Code Electric Products Corp—see Code Products Corp
Code Equipment Sales Co P O Box 5847 Philadelphia
28 Pa
Code Products Corp—see Code Equipment Sales Co Looe cquipment Saies Co P U Box 5847 Philadelphia 28 Pa Code Products Corp—see Code Equipment Sales Co COFFEE-HOT—Supreme Electric Products Co Coffing Hoist Co—see Coffing Hoist Div Duff-Norton Co Coffing Hoist Div Duff-Norton Co Comma Hoist Div Duff-Norton Co Comma Hoist Div Duff-Norton Co Comma Hoist Div Duff-Norton Co Coll Co of America Inc 207-209 Washington St Northwale NJ COIL-FLEX—Ideal Industries Inc Cold Cathode Corp—see Cold Cathode Lighting Corp Cold Cathode Lighting Corp 42-40 27th St Long Island City NY COLDCOTE—Anaconda Wire & Cable Co Cole (C W) & Co Inc P 0 Box 3382 Los Angeles 54 Calif Cole Electric Products Co—see Federal Pacific Electric Cole Electric Products Co-see Federal Pacific Electric Co-Collins Machinery Corp 5474 Alhambra Ave Los AnGellis Machinery Corp 5474 Alhambra Ave Los AnGellis Tissulated Wire Co 249 Roosevelt Ave PawGellis Tissulated Tissu

COLOVOLT—Poliak Luminescent Corp Columbia Cable & Electric Corp 255 Chestnut St Brooklyn 8 New York Columbia Electric Mfg Co 4519 Hamilton Ave Cleve-land 14 Ohio Brooklyn & New York
Columbia Electric Mfg Co 4519 Hamilton Ave Gieveland 14 Ohio
Columbia Electric & Manufacturing Co North 2310
Fancher Way Spokane Washington
COLUMBIA-FLEX—Columbia Cable & Electric Corp
Columbia Industries—see Columbia Products Inc
Columbia Metal Box Co 260 East 143 St New York
51 New York 51 New York Inc
Columbia Products Co
COLUMBUS—Conduit Pipe Products Co
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COMET—Dietz (R E) Co
COMET—Standard Electric Co Inc
Comet Lamp Co 7 E 35 St New York 16 NY
COMFOE—Mine Safety Appliances Co
COMFORT CONTROL—Controls Co of America
COMFORT-EASE—Sumwarm Inc
COMPACK—General Comport
Composition Inc
COMPACK—General Cable Corp
Compoc Corp 1800 N Spaulding Ave Chicago 47
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Compoc Corp 1800 N Spaulding Ave Chicago 47
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Compoc Corp 1800 N Spaulding Ave Chicago 47 CONDEX—Bound Brook Oil-Less Bearing Co
CON-FER-PHONE—Simpson (Mark) Mfg Co
Inc
CON-LET—Goldak Co
CON-DOR—Chicago Rawhide Mfg Co
CON-TAC-TOR—Minneapolis-Honeywell Regulator Co
CON-TAC-TOR—Minneapolis-Honeywell Regulator Co
CONTAC-TOR—Minneapolis-Honeywell Regulator Co
CONTAC-TOR—Minneapolis-Honeywell Regulator Co
CONTENTROL—Continental Electric Equipment Co
CONCENTROL—Continental Electric Equipment Co
CONCENTROL—Continental Electric Equipment Co
CONCOR—Simplex Wire & Cable Co
CONDOR—Simplex Wire & Cable Co
CONDOR—Simplex Wire & Cable Co
CONDOR—Allis-Chalmers Mfg Co
CONDOR—Raybestos-Manhattan Inc
Condulor Corp 3338G Warren Rd Cleveland 11
Dhio Ohio Offic
Conduit of Columbus—see Conduit Pipe Products Co
Conduit Nipple Mfg Co 1455 Spring Garden Ave
Pittsburgh 12 Pa
Conduit Pipe Products Co 157 West Fulton St Columbus 16 Ohio
CONDULET—Crouse-Hinds Co
CONDULETTO—Crouse-Hinds Co CONEX-Weiss & Biheller Merchandise Corp CONIC-Hilti Rapid Fastening Systems Inc CONNECTALL—Waage Mfg Co Connecticut Electric Mfg Co Main St Bantam Conn Connecticut Hard Rubber Co 407 East St New Haven 9 Conn
CONRAD THE CONTROL—Dixie Controller Inc
CONSOLAIRE—Remington Corp Remington A Remington Air Conditioning Div CONSTELLATION—Trindl Products Ltd CONSTELLATION—Trind Products Ltd
CONTAX—Biackburn (Lasper) Corp
CONTINENTAL—Crane (HW) Co
CONTINENTAL—Globe Lighting Products Inc
Continental Carbon Div of Wirt Co 5221 Greene St
Philadelphia 44 Pa
Continental-Diamond Fibre Newark Del
Continental Electric Co 1234 S Prairie Ave (P 0
Box 895) Hawthorne Calif
Continental Electric Co Inc 325 Ferry St Newark 5
New Jersey New Jersey
Continental Electric Equipment Co Box 1055 Cincinnati 1 Ohio
Continental Radiant Glass Heating Corp 1 East 35 St Continental Radiant Glass Heating Corp 1 East 29 St New York 16 New York Continental Wire Corp 560 Maryland Ave York CONTRA-TORQUE—Electric Controller & Mfg Co Control Panel Corp 517 W Monroe St Chicago 6 III CONTROLAGE—Vickers Inc CONTROLAGE—Wischers Inc CONTROLAGE—Wischers Inc CONTROLENS-Holophane Company Inc CONTROLENS—Holophane Company Inc CONTROLITE—Line Material Industries CONTROLITE—Ward Leonard Electric Co CONTROLOMAX—Sangamo Electric Company Controls Co of America 2450 N 32 St Milwaukee 45 Controls Co of America 2450 N 32 St Milwaukee 45 Wike Nike P 0 Box 9671 Pittsburgh 16 Pa CONVERS-0-CALL—Adcrafters Co CONVERTI-FUSE—General Electric Co Industrial Power Components Div CONVORTOL—Automatic Electric Co Cook's Sons (Adam) Inc 5 N Stiles St Linden NJ COOL-CIRCLE-ATOR—Kisco Company Inc COOL-CIRCLE-ATOR—Kisco Company Inc COOL-CIRCLE-ATOR—Kisco Company Inc COOL-STREAM—Karen Corp COOL STREAM—Karen Corp COOLAIR—American Coolair Corp COOLAIR—American Coolair Corp COOLERO—Hirschman-Pohle Co Inc COOLINE—Ohlo Brass Co COOLINE—Ohlo Brass Co COOLTONG—Lincoln Electric Co COOLTONG—Lincoln Electric Co
Cooper (D C) Co 1467 S Michigan Ave Chicago 5 III
Cooper Hewitt Electric Co 720-732 Grand St
Hoboken NJ
Co-operative Utilities Co Inc 4637-39 Mulberry St
Phila 24 Pa

COPACO—Cottrell Paper Co Inc
COPALAM—Cottrell Paper Co Inc
COPE (T J) Div Rome Cable Corp Collegeville 5 Pa
COPING-LITE—Magni Flood Inc
COPERDIV—National-Standard Co
COPPERTONE—Globe Lightling Products Inc
Coppered Steel Co Wire and Cable Div Glassport
Pa Coppus Blue Ribbon Products—see Coppus Engineering Coppus Engineering Corp 344 Park Ave Worcester 10 Mass CORDETTE CASUALS—More Light Div Ordomatic Div Vacuum Cleaner Corp of America 1724 W Indiana Ave Phila 32 Pa CORDON—I TE Circuit Breaker Co CORE-O-MATIC—Induction Heating Corp CORNEI-Dubilier Electric Corp 333 Hamilton Blvd South Plainfield NJ Corning Glass Works Corning New York Cornis Wire Co Inc 50 Church St New York 7 New York CORONA—Versen (Kurt) Company Corona Equipment Co Inc—see Corona Mfg Corp Corona Mfg Corp 11300 Tuxford St Sun Valley Calif CORONET—Curtis Lighting Inc CORONOL—General Electric Co Construction Materials Div COROPRENE—Cornish Wire Co Inc COROPREX—Cornish Wire Co Inc CORONEMEX—Cornish Wire Co Inc
COROX—Westinghouse Electric Corp
CORRALINE—Day-Brite Lighting Inc
CORRALOUSE—Day-Brite Lighting Inc
CORRALITE—Holphane Company Inc
CORRETALITE—Holphane Company Inc
CORRIS—Ohmite Manufacturing Co
CORRU-LUMINUS—Luminous Cellings Inc
COSTRU-LUMINUS—CORRUS St Fall River
Mass Couch (S H) Co Inc 33 Arlington St North Quincy 71 Mass
COUCH-CALL—Comm (S H) Co Inc Country 71 Mass
COUCH-CALL—Comm (S H) Co Inc Counter & Courth ordnance Div—see Couch (S H) Co Inc Counter & Control Corp 5225 W Electric Ave Milwaukee 19 Wisc COUNTER MATE—Wells Mfg Co COZY GLOW—WestInghouse Electric Corp CRABLOK—Burndy Corp CRABLOK—Burndy Corp Craft Laboratories P O Box 606 Westfield NJ CRAFT LITE—Paramount Industries Inc CRAFTSMA—Stahl Metal Products Inc Crane (HW) Co 15 N 9th Ave Maywood Ill Crane-Puller Co Waltham 54 Mass CRAMELITE—Hollophane Co Inc CraneVeylor Corp 1240 S Boyle Ave Los Angeles 23 Calif CRESCENT—Abrams Lighting CraneVeyor Corp 1240 S Boyle Ave Los Angeles 23 Calif CRESCENT—Abrams Lighting CRESCENT—Wheeler Reflector Co Crescent Co Inc 20 Central Ave Pawtucket RI Crescent Insulated Wire & Cable Co 319 North Olden Ave Trenton 5 New Jersey Crescent Tool Co 200 Harrison St Jamestown 4 NY CRESGORD—Crescent Insulated Wire & Cable Co CRESFLEX—Crescent Insulated Wire & Cable Co Crest Transformer Corp 1834-36 W North Ave CRESFLEX—Crescent Tool Co CRESTBRITE—Crest Transformer Corp CRESTBRITE—Crest Transformer Corp CRESTNAN—Crest Transformer Corp CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CRESTNAN—CR Crocker-Wheeler Div Elliott Co Ampere NJ
Crocker-Wheeler Electric Mfg Co—see Crocker-Wheeler
Div
CROSBY—American Hoist and Derrick Co
Crouse-Hinds Co Syracuse 1 NY
CROWN—Miller Co
Crown Industrial Products Co 713 Amsterdam St
Woodstock III
Crownlite Fluorescent Co 7 Roselle St Mineola NY
Crozier Machine Tool Co 684 N Prairie Ave Hawthorne Calif
CRYSTAL VALVE—Delta-Star Electric Div H K
Porter Co Inc
Crystalheat Co—see General Alliance Corp
Cummins-Chicago Corp—see Cummins Portable Tool Div
John Oster Mfg Co
Cummins Portable Tool Div John Oster Mfg Co 5055
N Lydell Ave Milwaukee 17 Wis
Cummins Portable Tools—see Cummins Portable Tool
Div John Oster Mfg Co
CUPRON—Driver (Wilbur B) Co
CUPRON—Driver (Wilbur B) Co
CUPRON—Driver (Wilbur B) Co
CURRENTROI — Incoln Electric Co

Inc
CURRENTROL—Lincoln Electric Co
CURTAIN OF LIGHT—Electronic Control Corp
CURTICELL—Curtis Lighting Inc
Curtis Development & Mrg Co 3244 N 33 St Milwaukee 16 Wis
Curtis Lighting Inc 6135 West 65th St Chicago 38

III
Curvis Mfg Co Refrigeration Div 1905 Kienlen Ave
St Louis 20 Mo
CURTISTRIP—Curvis Lighting Inc
CURVETTE—Steber Mfg Co
Curvitte Surgical Products Co—see Mastercraft Plastics Co Inc

ties Co Inc CUSHIONED POWER—White-Rodgers Co CUSTOM-AIR—Trane Company CUSTOM TEN—Simpson (Mark) Mfg Co Inc

CUTAWL—International Register Co Cutler Electrical Products Inc 5524 Haverford Ave Philadelphia Pa Cutler-Hammer Inc 228 North 12 St Milwaukee 1 WISCONSIN
Cutler Industries Inc—see Cutler Light Mfg Co
Cutler Light Mfg Co 2026 N 22 St Phila 21
Cutler Sign Advertising Co—see Cutler Light Mfg Co
CYBER MOTIVE—Dalmotor Co CYBER MOTIVE—Dalmiotor Co
CYCLO-CORE—New England Carbide Tool Co Inc
CYCLO-MONITOR—Counter & Control Corp
CYCLO-TWIST—New England Carbide Tool Co Inc
CYCLOHM—Howard Industries Inc
CYCLOHM—Howard Industries Inc
CYCLOHE—Chisholm—Moore Hoist Div Columbus
Kinnon Chain Corp
CYCLONE—New England Carbide Tool Co Inc
CYCLONE—New England Carbide Tool Co Inc
CYCLONE—Scranton Storage Battery Corp
CYLONE—Scranton Storage Battery Corp
CYLENT—Brook Motor Corp

D.H.D.—Diamond expansion Boit Co Inc
D/L—Derrick Light & Equipment Co
D-LITE—Dietz (R E) Co
DPR, Inc.—see Hardman (H V) Co Inc
D & R Ltd 402 E Gutlerrez St P O Box 1500
Santa Barbara Calif
DTX—Diamond Wire & Cale Co
DAGLAS—Phelps Dodge Copper Products Corp
DAISY—American Pulley Co
Dake Corp 675 Robbins Rd Grand Haven Mich
Dake Engine Co—see Dake Corp
Dalmotor Co 1375 Clay St Santa Clara Calif
Dalmotor Co 534 Laurel St San Carlos Calif
Dalton Electric Heating Co 11 Goodhue St Salem
Massachusetts Massachusetts
DAMCO—Murray (DA) Co Inc
DAMPCOAT—Wilbur & Williams Co
Dampe-Chaser Inc 1440 Ridgewood Blvd Hendersonville NC wille NC
Dana Fan & Blower Corp 2644 Colerain Ave Cincinnati 14 Ohio
Dante Electric Mfg Co Bantam Conn
DARAY—Lightolier Inc
Davenport Mfg Co 1713 N Ashland Ave Chicago 22
DAVEY—Wibroscope Co
David's Gloves Inc 21 W Pleasant St Springfield Davidson Fan Co 213 California St Newton 58 Davidson Fan Co 213 California St. Newton 58 Mass Davis (Dean W) & Co—see Dormeyer Industries Davis Electric Co 28 Parker St. Wallingford Conn Day-Brite Lighting Inc 6260 N Proadway St. Louis 15 Mo Day-Brite Lighting Inc 6260 N Proadway St Louis
15 Mo
Day-Ray Products Inc 1133 Mission St South Pasadena California
DAYANITE—Price Bros Inc
DAYLUME—Day-Brite Lighting Inc
DAYSTAR—Lighting Products Inc
Dayton Electric Laboratory—see Delco Products Div
General Motors Corp
Dayton Electric Mfg Co 126 5 Oakley Bivd Chicago
12 III
Dayton Precision Mfg Co 213 Beckel St. Dayton 3 Dayton Precision Mfg Co 213 Beckel St Dayton 3 Ohio Dayton Pump & Mfg Co—see Taitco Div Tait Mfg Co Dayton Rubber Co Dayton 1 Ohio Dayton Safety Ladder Co 2337 Gilbert Ave Cincinnati Dayton Rubber Co Dayton 1 Ohio
Dayton Safety Ladder Co 2337 Gilbert Ave Cincinnati
6 Ohio
DAZIC—Winterburn Mfg Co
DE-FROST-IT—Paragon Electric Company
DE-ION—Westinghouse Electric Corp
DE-STAT CLOTH—Globe Laboratories
DEAN—Solar Light Mfg Co
DEBONAIRE—Westinghouse Elec Corp
DECTRON—Pest Machinery Co
DECORATOR—House-O-Lite Corp
Detcrir Corp—Governe-Measurements Div—see Computer-Measurements Corp
DEFENNSE LIGHT—Electric Cord Co
DeJur-Amsco Corp 4501 Northern Bivd Long Island
City 1 Ny
DEKORON—Republic Steel Corp Steel & Tubes Div
Detco Products Div General Motors Corp 329 E 1st
St Dayton 1 Ohio
DELTA—Diamond Expansion Bolt Co Inc
Delta Chemical Works Inc 23 W 60 St New York
23 NY
Detar State Sta 23 NY
Delta-Star Electric Div H K Porter Co Inc of Pitts-burgh 2437 Fulton St Chicago 12 III
DELTABESTON—General Electric Co Construction Ma-DELINOCIONI

terials Div

DEMCO—Dixie Electrical Mfg Co

DEMKOTE—Dayton Electric Mfg Co

DEM El Equipment Co—see Electric Cord Company

DENEL—Electric Cord Co DENEL—Electric Cord Co
DENSHEATH—Anaconda Wire & Cable Co
DENSTROL—Precision Thermometer & Instrument Co
DENTROL—Anaconda Wire & Cable Co
DEPEND A TROL—Hankscraft Co
Dependable-Electric Mfg Co Inc 537 Johnson Ave
Brooklyn 37 NY
Derrick Light & Equipment Co 1201 E Daggett
(P O Box 414) Fort Worth Tex
DESPARD—Pass & Seymour Co
Despatch Oven Co 619 S E 8th St Minneapolis 14
Minn
DETECT-A-FIRE—Engral Inc Minn
DETECT-A-FIRE—Fernwal Inc
DETECT-A-FI.O—Fernwal Inc
DETECTO-LITE—Eagle Electric Mfg Co Inc

Detroit Diesel Engine Div General Motors Corp 13400 W Outer Dr Detroit 28 Mich Detroit Electric Furnace Div Kuhlman Electric Co 8ay City Mich Detroit Hoist & Machine Go 8292 Morrow St Detroit 11 Michigan Detroit Lubricator Co—see Detroit Controls Div American-Standard 5900 Trumball Ave Detroit 8 Mich Detroit Lubricator Co—see Detroit Controls Div American-Standard 5900 Trumball Ave Detroit 8 Mich Co—see Young Bros Co Detroit Sheet Metal Co—see Young Bros Co Detroit Sintered Metal Corp—see Bunting Brass and Bronze Co
DETROITER—Detroit Hoist & Machine Co
DEVISIBIS CO 300 Phillings Ave Toledo 1 Ohlo
DeWalt Div American & Foundry Co Fountain Ave
Lancaster Pa
DeWalt Inc—see DeWalt Div
DEWALTER—Beam Manufacturing Co
DEXTER—Beam Manufacturing Co
DEXTER—Beam Manufacturing Co
DEXTER—Beam Manufacturing Co
DI-EN-KEY—Diamond Expansion Bolt Co Inc
DI-ACRO—O'Neil-Irwin Mifg Co
DI-EN-KEY—Diamond Expansion Bolt Co Inc
DI-FORGE—Diamond Expansion Bolt Co Inc
DI-FORGE—Diamond Expansion Bolt Co Inc
DI-STOCK—Klein (Mathias) & Sons
DIACLOR—Sangamo Electric Co
DIALS-AW-Enwood Inc
DIALO—General Electric Co
DIALOR—General Electric Co
DIALOR—General Electric Co
DIALOR—Diamond Tool and Horseshoe Co
DIAMOND—Diamond Tool and Horseshoe Co
DIAMOND—Eagle Electric Mifg Co Inc
DIAMOND—Deagle Electric Mifg Co Inc
DIAMOND—Hant Manufacturing Co
Diamond Expansion Bolt Co Inc Garwood New Jersey
DIAMOND—Hant Manufacturing Co
Diamond Expansion Bolt Co Inc Garwood New Jersey
DIAMOND—Hant Manufacturing Co
Diamond Tool and Horseshoe Co—4702 Grand Ave
Dullut 7 Minn
Diamond Wire & Cable Co 445 Park Av Sycamore Diamond Wire & Cable Co 445 Park Av Sycamore Dicke Tool Co 1201 Warren Ave Downers Grove Dickey-Grabler Co 10302 Madison Ave Cleveland 2 Ohio
DIECK—Bodendieck Tool Co
DIEFLEX—Suffex Corp
Diehl Manufacturing Co 1187 Finderne Ave Somerville Dieni Manuracturing Co 1107 Finderine Ave Solientine
New Jersey
DIELITE—Everett (E A) Inc
Dietz (Henry G) Co Inc 12-16 Astoria Blvd Long
Island City 2 NY
DIFFUSO—Appleton Electric Corp
DIGTRONIC—Weltronic Co DILEC—National Electric Products Corp DIM-A-LITE—Minneapolis-Honeywell Regulator Co Dings Brakes Inc 4740 W Electric Ave Milwaukee 4 Wis Wis

DP-PAK—Fidelity Chemical Products Corp
DIRECTOLITE—Line Material Industries
DIRECTOR—Industrial Lamp Corp
DIRECTORA—Salton Manufacturing Co Inc
DIRECTORALTE—Duro-Test Corp
DIRECTORLITE—Duro-Test Corp
DIRECTORL—Automatic Control Co
DIRECTOR—Miller (Sanford) Co
DISCUS—Curits Lighting Inc
DISINFECTAIRE—Art Metal Co
DISKANBECT—Appletor Electric Co DISINFECTAIRE—Art Metal Co
DISKONECT—Appleton Electric Co
DISPLAYOLITE—Ruby-Philite Corp
Distribution and High Line Specialties Co 2100 Del
Norte St Louis 17
DITCH-WITCH—Charles Machine Works
DIVCO—Division Lead Co
DIVODDHM—Ohmite Manufacturing Co
DIVODOHM—Ohmite Manufacturing Co
DIVISION Lead Co 7742 W 61 Pl
Dixle Controller Inc Post Office Box 5844 Birmingham 9 Ala
Dixie Electrical Mfg Co P 0 Box 745 Birmingham Ala Dixie Logging Tool Co Chattanooga Tenn Dixie Radiant Glassheat Co—see Dixie Raydiant Electric Disie Radiant Glassheat Co—see Dixle Raydlant Electric
Heat Corp
Dixle RAY—Dixie Raydlant Electric Heat Corp
Dixle RAY—Dixie Raydlant Electric Heat Corp
Dixle Raydlant Electric Heat Corp 66 Eleventh St NE
Atlanta 9 Ga
DO-ALL—Cable Electric Products Inc
DO-ALL—Oddack Electric Tool Corp
Dockson Corp 3839 Wabash Ave Detroit 8 Michigan
Doclcam Corp—see Minneapolis-Honeywell Regulator Co
Boston Div
Dolph (John C) Co Monmouth Junction NJ
DOME ALZAK—Guth (Edwin F) Co
Dominion Electric Corp 150 Elm St Mansfield Ohio
Dongan Electric Mfg Co 2987-3001 Franklin St Detroit 7 Mich
DONWOOD—Sierra Electric Corp
DOQR-LIFT—Brown-Brockmeyer Co DOOR-LIFT—Brown-Brockmeyer Co Doors & Operators Inc-see Quincy Mfg Co Dormeyer Industries 3418 Milwaukee Ave Chicago 41 Illinois Illinois
Dorsey (John E) Co 570 E First St Boston 27 Mass
DOS-LUG—Dossert Mfg Corp
DOSLOV—Dossert Mg Corp
Dossert Mfg Corp
Dossert Mfg Corp
Dossert Mfg Corp
Dossert Mfg Corp
DOSSON—Dossert Mfg Corp

DOSTEX—Dossert Mfg Corp
DOSULON—Dossert Mfg Corp
DOUBLE DIAMOND—H-B Instrument Co
DOUBLE-INGINEERED—Metalectrics Inc
DOUBLE-INGINEERED—Metalectrics Inc
DOUBLEA-MOSION—Hastings Air Conditioning Co Inc
DOUBLEGLA—Mission Appliance Corp
DOUBLEGLA—Mission Appliance Cor DOUBLENCLOSED—U S Electrical Motors Inc
DOUBLEX—Johns Marville
Dow Corning Corp Midland Mich
DOWNLITE—Rambusch Decorating Co
Doyle (J E) Co 1220 W 6th 5t Cleveland 13 Ohio
Doyle Electric Dryer Co—see Doyle Co J E
Doyle Vacuum Cleaner Co 234 Stevens 5t S W
Grand Rapids Mich
DRACO—Versen (Kurt) Company
DRACO—CU—Versen (Kurt) Company
DRAMALITE—Century Lighting Inc
DREADNAUGHT—MetalCarát Producis Co Inc
DREADNAUGHT—MetalCarát Producis Co Inc
DREADNAUGHT—Paranite Wire & Cable Div Essex
Wire Corp Wire Corp
DREADNAUGHT—Wall (P) Manufacturing Co
DREADNAUGHT—Kraeuter & Co Inc
Dreier Brothers Inc 7301 Woodlawn Ave Chicago 19 DREXEL—Keystone Electric Mfg Co
DREXEL—Keystone Electric Co Chemical & Metallurgleal Div
DRI-FILM—General Electric Co Chemical & Metallurgleal Div
DRI-FILM—General Electric Co Chemical & Metallurgleal Div
DRI-FIRM—Land-Air Inc
DRIVENDEN—Durant Corp
DRIVE-IT—Omark Industries Inc
DRIVEPOINT—Hubbard & Co
Driver (Wilbur B) Co 1875 McCarter Highway Newark
4 Notes of the Corp Corp of Greensburg Ind
DRY-EX—American Dider & Flux Co
DRY MASTER—Dryomatic Corp
DRYSALV—American Solder & Flux Co
DRY MASTER—Dryomatic Corp
Dryomatic Corp 806 N Fairfax St Alexandria Va
DRYVIN—Star Expansion
DU-OP—General Control Co
DUA-LITE—Gorders Mfg Co
DUA-LITE—Gorders Mfg Co
DUAL-EX—Hoodberg Mfg Co
DUAL AIRE—Ilip Electric Products Inc
DUAL COTE—Walker Brothers
DUAL GOTE—Walker (1 A) Co
DUAL HEAT—Jensen Specialties Inc
DUAL HEAT—Jensen Specialties Inc
DUAL-HEAT—Heaver (1 A) Co
DUAL-TE—Clettric Arc Inc
DUAL-TE—Clettric Storage Battery Co
DUAL-TE—Clettric Storage Battery Co
DUAL-TE—Duro-Test Corp
DUAL-TER—Duro-Test Corp
DUCT-TATHERM—Mercoid Corp
DUCT-TATHERM—Mercoid Gorp
DUCT-TATHERM—Mercoid Gorp DREXEL—Keystone Electric Mfg Co DRI-FILM—General Electric Co Chemical & Metallur-GRIP-Anderson Electric Corp DURA GRIP—Anderson Electric Corp
DURA LUG—Anderson Electric Corp
DURA-TEMP—General Blower Co
DURABAKE—S & C Electric Co
DURABAKE—S & C Electric Co
DURACORD—Anaconda Wire & Cable Co
DURAFLEX—Co-operative Industries Inc
DURAGE—Manning Maxwell & Moore Inc
DURAGE—Duray Fluorescent Mfg Co
DURALINE—Duray Fluorescent Mfg Co
DURALINE—Anaconda Wire & Cable Co DURALOX—Anaconda Wire & Cable Co
DURAMATIC—Dura Electric Lamp Co Inc
Durant Mfg Co 1987 No Buffum St Milwaukee 1 With Manager Cable Co
DURAPENE—Anaconda Wire & Cable Co
DURAPERAL—Anaconda Wire & Cable Co
DURAPERAL—Anaconda Wire & Cable Co
DURATACH—Wheeler Reflector Co
DURATOR—Tobe Deutschmann Corp
DURAP Corp. DURIUM—Burndy Corp
DURO-BRACE—Allis-Chalmers Manufacturing Co
Duro Fittings Co 2210 S Davie Ave Los Angeles 22 DURO-LITE-Duro-Test Corp Duro Metal Products Co Kildare & Schubert Sts Chicago III Duro-Test Corp 2321 Hudson Blvd North Bergen NJ Duro-Test Corp 2321 Hudson Blvd North Bergen NJ
DUROLIER—Duro-Test Corp
DUST TITE—Adam (Frank) Electric Co
DUSTFOE—Mine Safety Appliances Co
DUSTITE—Adam (Frank) Electric Co
DUTCH BOV—Mational Lead Company
Dutch Brand Div Johns-Manwille 7800 S Woodlawn
Ave Chicago 19 III
DUTRAX—Anaconda Wire & Cable Co

DUXSEAL—Johns-Manville
DUZ-ALL—Slebring Mfg Co
Dwyer (F W) Mfg Co Woodland at Greenwood (P O
Box 373) Michigan City Ind
DYN-AUT-RONIC—Gisholt Machine Co
DYNALITE—Mitchell Manufacturing Co
DYNALITE—Mitchell Manufacturing Co
DYNAMOTIVE—Automatic Transportation Co
DYNAMOTIVE—Cautomatic Transportation Co
DYNAPOWER—Carol Cable Co
DYNAPOWER—Carol Cable Co
DYNAPOWER—Carol Cable Co
DYNASEAL—Whitney-Blake Co
DYNAS

E

EASCO—Electric Arc Sales Co
E. C. & M.—Electric Controller & Mfg Co
ECO—Economy Fuse & Manufacturing Co
ECOA—Equipment Corp of America
ECON—Economy Fuse & Mfg Co
EDCO—Eyron-Dakin Co
EE—Elliott Electric Products Co
EEECO—Marvin Electric Mfg Co
EF—Electrical Fittings Corp
EJS Corp—see EJS Lighting Corp
EJS Cup-see EJS Lighting Corp
EJS Lighting Corp 321 E Pico Blvd Los Angeles 21
Calif EJS Corp—see EJS Lighting Corp
EJS Lighting Corp 321 E Pico Blvd Los Angeles 21
Calif
EJS Lighting Carp 321 E Pico Blvd
Los Angeles 21
Calif
E-LITE—Guth (Edwin F) Company
ELFCO—Everglow Lighting Fixture Co Inc
ELINCO—Electric Indicator Co Inc
E-M.C.—Howard Industries Inc
EMCO—Eavl Electric Mfg Corp
EMCO—Eavl Electric Mfg Corp
EMCO—Euder-Monarch Corp
EMICO—Electro-Mechanical Instrument Co
E-N.Electro-Nite Carbon Company
ESS—Electric Service Systems Inc
ETC—Electric Terminals Corp
ETC—Electric Terminals Corp
ETC—Electric Terminals Corp
ETC—Electric Terminals Corp
ETC—Electric Terminals & Connectors Inc
ETC—Electric Terminals Corp
EZ—Henderson Electric Corp
EZ—Pann-Union Electric Corp
EZ—Penn-Union Electric Corp
E-Z—Penn-Union Electric Corp
E-Z—Penn-Union Electric Corp
E-Z—Penn-Union Electric Corp
E-Z—Penn-Union Electric Mfg
E-Z COTTER—Collins Machinery Corp
E-Z MARK—Crown Industrial Products Co
E-Z-RED—Wadsworth Electric Mfg Co Inc
E-Z SERVICER—Wiley (R & W) Inc
E-Z STRIPPER—Ideal Industries Inc
E-Z SWINGING—Acme Lite Products Co
E-T-ALK—Simpson (Mark) Mfg Co Inc
E-AGALINE—Eagle Electric Mfg Co Inc
E-AG Eagle Manufacturing Co 3508 Avalon Blvd Los Angeles 11 California
Eagle-Picher Co American Building Cincinnati 1
Ohio
Eagle Plastics Co—see Eagle Electric Mfg Co Inc
Earl (H W) & Co 6225 S W 8th St Miami 44 Fla
Earl Electric Mfg Corp 35-20 Borden Ave Long
Island City NY
Early (Edward E) Co 1129 5th St NW Canton 3 Ohio EASCO—Electric Arc Sales Co EASIMOUNT—Edwards Co Inc
EASTERN—Circle F Mfg Co
Eastern Specialty Co 3617 N 8th St Phila 40 Pa
Eastern Tube & Tool Co Inc—see Ettco Wire & Cable Eastern Specialty Co 3617 N 8th St Phila 40 Pa
Eastern Tube & Tool Co Inc—see Ettco Wire & Cable
Corp
EASTEX—Circle F Mfg Co
EASY-ON—Thiel Tool & Engineering Co Inc
EASY TACH—Quadrangle Mfg Co
EASY WIRE—Gem Electric Mfg Co Inc
Ebco Mfg Co 265 N Hamilton Rd Columbus 13 Ohio
EBERHARDT-DENVER—Morse Chain Co
Ebert Electronics Corp 212-26 Jamaica Ave
Queens
Village 28 L 1 NY
ECLIPSE—Frick Co
ECLIPSE—Montgomery Tool Co
ECLIPSE—Sperti Faraday Inc
ECOM—Economy Fiss & Manufacturing Co
ECON—CONOMY—Simpson (Mark) Mfg Co Inc
ECONICOM—Simpson (Mark) Mfg Co Inc
ECONOMY—Simpson (Mark) Mfg Co Inc
ECONOMY—Coates Electric Mfg Co
ECONOMY—Costes Electric Mfg Co
ECONOMY—Ceystone Electric Mfg Co
ECONOMY—Reystone Electric Mfg Co
Economy Fuse & Manufacturing Co
View Ave Chicago 12 Illinois
Economy Fuse & Manufacturing Co
View Ave Chicago 14 Illinois
Economy Fuse & Manufacturing Co
View Ave Chicago 14 Illinois
ECOC—Eynon-Dakin Co
Edec International Corp
DotMAG—Electric Controller & Mfg Co
Ederer Engineering Co 2943 1st Ave S Seattle 4
Washi Ederer Engineering Co 2943 1st Ave S Seattle 4 EDGE-GLO-Curtis Lighting Inc EDGE RAY-Curtis Lighting Inc Edison Heatube Div McGraw Edison Co 612 Grand St Allegan Mich

Edison Storage Battery Div McGraw-Edison Co West Orange NJ Edmor Lamp Co Inc 1867 Flatbush Ave Brooklyn 10 NY Edmor Lamp Co Inc 1867 Flatbush Ave Brooklyn 10 NY EDUCATOR—Lighting Products Inc Edwards Co Inc Norwalk Conn Edwards of Canada Ltd—see Edwards Co Inc EFCOR—Electrical Fittings Corp EFCORLET—Electrical Fittings Corp Efficiency Electric & Mfg Co Park Ave Ext Box 30 East Palestine Ohio EffICO—Hirschman-Pohle Co Inc Eicor Div F L Jacobs Co 4235 W North Ave Chicago 39 III Elcor Inc—see Eicor Div Eisenstat David—see Metalectrics Inc Eiserstat David—see Metalectrics Inc Eisers Engineering Co Inc 750 S 13 St Newark 3 NJ NI EITHERND—Anderson (Albert & JM) Mfg Co ELBOLIFT—Automatic Transportation Co Electra Motors Inc 1110 N Lemon St Anaheim Calif Data Company of Calif Motors in TITU N Economics Calification Calification Calification Calification Calification Calification Calification California Californ Inc
Electric Arc Sales Co P O Box 587 Ypsilanti Mich
Electric Boat—see Electro Dynamic Div
Electric Controller & Mfg Co 4493 Lee Rd Cleveland 28 Ohio Electric Cord Co 21 Spruce St New York 38 NY Electric Cord Co 21 Spruce St New York 38 NY Electric Deodorizer Corp—see Edoc International Corp ELECTRIC DOORMAM—Electric Power Door Co Electric Distribution Products Inc Allentown Pa ELECTRIC FLOWER—Aerolux Light Corp Electric Furnace Co West Wilson St Salem Ohio Electric Heating Products Inc—see Everwarm Inc Electric Hotspack Co Cottman Ave at Melrose St Phila 35 Pa Electric Indicator Co Inc Camp Ave Springdale Conn Ohio Cann
Electric Lighting Inc P 0 Box 1907 Stockton Calife ELECTRIC-LUMINUS—Luminous Ceilings Inc Electric Machinery Mfg Co 800 Central Ave Minnesdagolis 13 Minnesota Electric Materials Co Box 390 North East Pa Electric Motor Corp—see Howard Industries Inc Electric Motors & Specialties Inc King & Hamsher Sts Electric Products Co. 1725 Clarkston Rd Clerolard Company Co. 1720 Clarkston Rd Clerolard Co. 1725 Clarkston Rd Clerolard Co. 1725 Clarkston Rd Cleroland 12 Ohio Electric Railway Equipment Co—see Elreco Corp Electric Railway Improvements Co—see Erico Products Inc Electric Re-Light Co 625 So Goodman St Rochester 20 NY
Electric Regulator Corp Norwalk Conn
Electric Service Engineering Co—see Delta-Star
Electric Div (Essco Works) H K Porter Co
Electric Service Mfg Co—see Delta-Star Electric Div
H K Porter Co Inc
Electric Service Systems Inc 1330 Quincy St N E
Minneapolis 13 Minnesota
Electric Soldering Iron Co Inc
River Conn
Electric Soldering Iron Co Inc
Electric Specialty Co 211 South St Stamford Conmeeting Connections Connection NV necticut
Electric Steam Radiator Corp 1 Electric Ave Paris Ky Electric Switch Corp 2320 S Tibbs Ave P 0 Box 41037 Indianapolis 41 Ind Electric Tachometer Corp 68th & Upland Sts Phila NY
Electrical Engineers Equipment Co 25th Ave Melrose
Park III
Electrical Facilities Inc—see Knopp Inc
Electrical Fittings Corp 37-50 57th St Woodside 77 Electrical Mfg Co 425 Lake Ave Racine Wis Electrical Service Co (P 0 Box 1039 Greenville Texas Electrical Windings Inc 2015 N Kolmar Ave Chicago Electrical Windings Inc. 2015 N Kolmar Ave Chicago 39 III ELECTRICTUBE—Mark (Clayton) & Co Electrix Terminals & Connectors Inc. 990 E 67 St Cleveland 3 Ohio ELECTRO-CALORIC—Industrial Development Labs Inc ELECTRO-CAHANEL—Ceco Steel Products Corp Electro Compound Co. 4145 W 150 St (P 0 Box 2772) Cleveland 11 Ohio Electro Devices Co Inc. 580 Main St. Wilmington ELECTRO-COOLER—Allis-Chalmers Mfg Co Electro Devices Inc 116 S Michigan Ave Chicago 3 Electro Dynamic Div General Dynamics Corp 163
Ave A Bayonne NJ
Electro Engineering Works 401 Preda St San Leandro
Calif

ELECTRO-GLOW—Industrial Devices Inc ELECTRO-LARM—Electro Devices Inc Electro Lift Inc 204 Sargeant Ave Clifton NJ Electro Lighting Corp—see Electro Silv-Amiro Corp ELECTRO-MATIC—Eastern Industries Inc Automatic Electro-Mechanical Devices Co-see Nankervis (Geo L) Electro-Mechanical Instrument Co 8th & Chestnut Electro-Mechanical Instrument Co 8th & Chestnut Sts Perkasie Pa ELECTRO-PANE—Electro Devices Inc ELECTRO-PROBE—Erwood Inc Electro-Products Mfg Co 8310 N E Nighway 99 Electro-Products Mfg Co 8310 N E Highway 99
Vancouver Wash
ELECTRO RAY—Electro-Products Mfg Co
Electro Sitv-A-king Corp 1535 S Paulina St Chicago 81 Electro-Snap Switch & Mfg Co 4218-30 W Lake St Chicago 24 111
Electro-Technical Products Div Sun Chemical Corp 113 E Centre St Nutley 10' NJ
Electro Data Corp—see Consolidated Engineering Corp ELECTROFLO—Hays Mfg Co
Electroflow Inc—see American Electronics Inc
ELECTROLETS—Killark Electric Mfg Co
Electroline Mfg Co 2622 E 51st St Cleveland 4
Ohio Ohio

Electromaid Corp—see Can Arm Corp
ELECTROMATIC—National Time & Signal Corp
ELECTROMATIC—Siebring Mfg Co
Electromode Div Commerical Controls Corp
Box 1052 Rochester 3 NY
ELECTRONIC BUTLER—Simpson (Mark) Mfg Co Inc
Electronic Center—see Dalmotron Co
Electronic Control Corp 1573 E Forest Ave Detroit
T Mich
Electronic Management Electronic Control Gorp 1573 E Forest Ave Detroit 7 Mich 1 Mich 2 Div

ELEMEX—Line Material Industries

ELEXITE—Mational Specialties Co Inc

ELFCO—Everglow Lighting Fixture Co Inc

ELFCO—Everglow Lighting Fixture Co Inc

Eligin National Watch Co Electronics Div 366

Bluff City Blwd Elgin III

ELIED—Farrelloy Company

ELINCO—Electric Indicator Co Inc

ELIPTICONE—Art Metal Co

ELIPTISQUARE—Art Metal Co

ELIPTISQUARE—Art Metal Co

ELIPTIGNE—Arewere Electric Mfg Co

Elite Glass Co 111 West 22 St New York 11 New

York ELIPTOR—Reverse Execute ming of the Control of the ELTECO Corp 2900-18 Cormany Ave Cincinnati 25 Ohio ELSCO—Waveland Electric Co ELTAB—Burndy Corp ELTEX—Electro-Technical Products Div Sun Chemical Corp EMCO—Earl Electric Mfg Corp EMCO—Earl Electric Mfg Corp EMERSON—Quiet-Heet Mfg Corp Emerson Electric Manufacturing Co 8100 Florissant Ave St Louis Missouri Emerson Plastics Corp 1383 Seabury Ave Bronx 61

Emerson-Pryne Co 140 N Towne Ave (P 0 Box 698) Emerson-Pryne Co 140 N Towne Ave (P 0 Box 698) Pomona Calif Emerson-Quiet Kool Corp-see Quiet-Heet Mfg Corp EMICO—Electro-Mechanical Instrument Co EMILY—Porcelain Products. Inc EMPIRE—Dlamone Expansion Bolt Co Inc Empire Corp 1566 S 83 St Milwaukee 14 Wis Empire Products Inc—see Cam-Lok Div Empire Products Inc—see Cam-Lok Div Empire Products Inc—see Pittsburgh Standard Conduit Co

Co
ENAMELITE—Republic Steel Corp Steel & Tubes Div
ENAMELITE—Republic Steel Corp Steel & Tubes Div
ENAMELITOT—Mark C(Layton) & Co
Ender Mfg Corp—see Ender-Monarch Corp
Ender-Monarch Corp 50 Sylvester St Westbury NY
ENDON—Voltare Tubes Inc
ENDOVAL—Revere Electric Mfg Co
ENDULATOR—Revere Mfg Co
ENDULATOR—Respere Mfg Co
ENDURANCE—General Insulated Wire Works Inc
ENDURITE—Crescent Insulated Wire Works Inc
ENDURITE—Crescent Insulated Wire Works Inc
ENDURITE—Crescent Insulated Wire Works Inc
Engelhard (Charles) Inc 850 Passaic Ave East
Newark NJ
Engelhard Industries Inc 113 Astor St Newark 5
NJ
ENGINATORS—Wasterba Marco Co ENGINATORS-Waukesha Motor Co

ENPO-Piqua Machine & Mfg Co

ENTERITE—General Cable Corp EONITE—Kaiser Aluminum & Chemical Sales Inc EPCO Electronics Inc 140 Liberty St New York 6 NY EPOSET--Hardman (H V) Co Inc EPOSET—Hardman (H V) Co Inc EQUIALOAD—Keystone Carbon Co Equipment Corp of America 1537 Superior Ave Cleveland 14 Ohio BRIGKSOM—Thomas & Betts Co Erickson Power Lift Trucks Inc St Anthony Blvd & University Ave NE Minneapolis 18 Minn Erickson Special Equipment Mfg Co—see Erickson Power Lift Trucks Inc Erick Products Inc 2070 East 61 Place Cleveland 3 Ohio Ohio Ericson Mfg Co 1660 Hayden Ave Cleveland 12 Erie Electric Co Inc 343 Birdsall St Buffalo 2 NY Erie Glass Mfg Co 564 Union Trust Bidg Pittsburgh Erie Glass Mfg Co 564 Union Trust Bidg Pittsburgh 19 Pa Frie Malleable Iron Co Kondu Div—see Kondu Corp Erie Sales & Mfg Co—see Erie Glass Mfg Co Erie Tool Works 12th & Liberty Sts Erie Pa Erwood Inc 1770 Berteau Ave Chicago 13 111 ESCO—Electric Specialty Co ESCO—Electric Specialty Co ESCO—Electro Switch Corp Esco Mfg Co Box 1039 Greenville Tex ESCORTS—Stevens Appliance Truck Co ESECO—Delta-Star Electric Div (Eseco Works) H K Porter Co ESECO—Deltectric Soldering Iron Co Inc Esterline-Angus Co Inc P O Box 596 Indianapolis 6 Indiana ESTERINE-Angus Co Inc P O BOX 596 Indiana Indiana ESTROLITE—Line Material Industries Esty Mfg Co 112 S Sagamore St. Chicago 7 III ETTCO-FLEX—Etteo Wire & Cable Corp ETTCO-PLASTIC—Etteo Wire & Cable Corp Etteo Wire & Cable Corp 75 Onderdonk Ave Brooklyn 37 NY Euclid Electric & Mfg Co 50 Edwards St Madison EUREKA—Morse (Frank W) Co
EVANOHM—Driver (Wilbur B) Co
EVER-LOK-Russell & Stoll Company Inc
EVER-BLOK-Russell & Stoll Company Inc
EVEREADY.—National Carbon Co
Everett (EA) Inc 33-15 56th St
Everslow Lighting Fixture Co
Yonkers 3 NY
EVERGREEN—Snyder (M L) & Son Inc
EVERLITE—Curtis Development & Mfg Co
EVERLITE—Curtis Development & Mfg Co
Everwarm Inc 3600 Pleasant Ridge Rd Knoxville
Tenn
Ewald Instruments Box 124P Kent Conn
Excel Electric Service Co Inc 2113 S Western Ave
Chicago B III
Excel Fuse Co 117 W Erie St Pittsburgh 12 Pa
EXELLITE—Line Material Industries McGraw-Edison
Co EUREKA-Morse (Frank W) Co

EXELLITE—Line Material Industries McGraw-Edison
Co
Executione Inc 415 Lexington Ave New York 17
New York
Exide Industrial Div Electric Storage Battery Co 42
S 15 St Phila 2 Pa
EXIDUST—Lamson Corp
Exmet Electrical Corp 127 Marbledale Road P 0
Box 485 Tuckahoe NY
EXOLVE—Penetione Co
EXPANDER—Arro Expansion Bolt Co
EXPANDER—Arro Expansion Bolt Co
EXPLOSIMETER—Milne Safety Appliances Co
EXTEND-0-STRIP—Good Mfg Co Inc
EXTRAFLEX—Universal Metal Hose Co
EXTRRUDO-LITE—Magni Flood Inc
EYE COMPORT—Curtis Lighting Inc
EYE COMPORT—Curtis Lighting Inc
EYE EASY—Manning (RA) Co Inc
EYE SAING—Westinghouse Electric Corp
Eynon-Dakin Co 9900 Freeland Ave Detroit 27 Mich

FA—Adam (Frank) Electric Co
F & F—Trent Inc
F—Mallory (P R) & Co Inc
Fairbanks Co 393 Lafayette St New York 3 NY
Fairbanks Morse & Co 600 S Michigan Ave Chicago

5 III
FAIRFAX—Edwards Co Inc
FAIRWAY—Day-Brite Lighting Inc
FALCON—Guth Co Edwin F
Falcon Equipment Co 13th St (Box E-255) New

Brighton Pa Falk Corp 3022 W Canal St Milwaukee 1 Wiscon-

sin
Falstrom Co 62 Falstrom Court Passaic NJ
FAMOUS—Goshen Churn & Ladder Inc
FAM GLO—Markel Electric Products Inc
FAM-PAC—General Blower Co
FAMFARE—Fanon Electric Co Inc
Famon Electric Co Inc 98 Berriman St
NY
NEW Electronic Sales Computed Famon Electric Co Fanon Electronic Sales Corp-see Fanon Electric Co

Corp. See Fanon Electric Corp. See Fanon Electric Corp. FARADAY.—Sperti Faraday Inc. FARADOID.—Westinghouse Electric Corp. FARCO.—Farrelloy Company Fargo Mfg Co. Inc. 845 Main St. Poughkeepsie NY Faries Lamp Div. General Lamps Mfg Corp. 450 N. 9th St. Elwood Ind. Farles Mfg Corp.—see Faries Lamp Div. General Lamps Mfg Corp.—see Faries Lamp Div. General Lamp Mfg Corp.—see Faries Lamp Div. General Lamp Mfg Corp.—see Faries Lamp Div. General Lamp Mfg Corp.—see Faries La

Inc
Farmer Electric Products Co Inc 2300 Washington
St. Newton Lower Falls 62 Mass
FARMOTOR—Westinghouse Electric Corp
FARMSTARTER—Westinghouse Electric Corp
Farelloy Company 1245 North 26 St Philadelphia Farrelloy Company 21 Pennsylvania

Fasco Industries Inc Davis & Toppin Sts Rochester NY
Fasform Div Heller Roberts Mfg Corp 3610 Superior
Ave Cleveland 14 Ohio
FASHION—White-Rodgers Co
Fast-Lok Mfg Co Ash St at Bedford Bridgeport 5

Fast-Lok Mfg Co Ash St at Bedford Bridgeport S
Conn
FASTHOLD—Mitchell Band Insulation Co
Fastway Fasteners Inc 1676 E 28 St Lorain Ohio
FATHOMETER—Raytheon Mfg Co
FAULT FINDER—Parr Mfg Corp
FAULT MASTER—Hubbard & Co
FEATHERITE—Century Lighting Inc
FEATHER TOUCH—Theller (H J) Corp
FEATHERWEIGHT—Goldak Co
FEATHERWEIGHT—Wing (L J) Mfg Co
Fedders-Quigan Corp 58-01 Grand Ave Maspeth NY
Federal Electric Company Inc—see Federal Sign and
Signal Corp
Federal Electric Products Co—see Federal Pacific Electric Co

tric Co ederal Enterprises Inc—see Federal Sign and Signal Corp
Federal Lighting Corp 1425 Rockwell Ave Cleveland
14 Ohio

14 Ohio Present Edward Lighting Corp Federal Lighting Div—see Federal Lighting Corp Federal Machine and Welder Co Clermont & Overland Ave Warren Ohio Federal Pacific Electric Co 50 Parish St. Newark 5

NJ Federal Shock Mount Corp 1060 Washington Ave New York 56 NY State St Chicago 19 III Chicago 19 III Federal Signal Corp 8726 S State St Chicago 19 III Rederal Telephone & Radio Co—see I T & T Compon-

Federal Telepinone & Ratio Co-See 1 T & 1 Compon-ents DIV
Federated Metals Div American Smelting & Refining Co 120 Broadway New York 5 NY
FEED-IN-Square D Co Federal Corp 125 Barclay St New York 7 NY Feiler Engineering & Mfg Co 8026 N Monticello Ave Skokle III I No. 2000 Amberday Revy. Dallar

Skokle III
Felco Products Inc 8700 Ambassador Row Dallas
19 Tex
FEMOD—Fluorescent Equipment & Mfg Co
Femco Inc Irwin Pa
FENOE-RITE—Electric Systems Inc
FENOE-RITE—Electric Systems Inc
FERALOY—Crouse-Hinds Co
FERALOY—Crouse-Hinds Co
FERMONIT—International Fermont Machinery Co
Ferrara Inc 8106 W Nine Mile Rd Oak Park 37
Mich

FIBERDUCT-General Electric Co Construction Ma-

Fibre Conduit Co—see Orangeburg Mfg Co Inc FIBREMAT—Minnesota Mining & Mfg Co Irvington Div FIBROID—Johns-Manville

Fidelity Chemical Products Corp 470 Frelinghuysen Ave Newark 5 NJ Fidelity Electric Co Inc 332 N Arch St Lancaster

Pa

FILLOX—Subox Inc
FILLTRETTE—Tube Deutschmann Corp
FILTERIZED—Tube Deutschmann Corp
FILTERIZED—Tube Deutschmann Corp
FILTERIZED—Tube Deutschmann Corp
FINROD—Tuttle & Kift Inc
Fire Alarm Thermostat Corp 53 W 23 St New
York 10 NY
FIRE FUSE—Wind-Way Fan & Ventilator Co
FIREFLY—Northern Light Company
FIREFUNDE—Rockbestos Products Corp
FIREFLONE—Rockbestos Products Corp
FIRSTONE—Rockbestos Products Corp
Fisher—Rockbestos Products Corp
Fisher—Rockbestos

Fisher-Pierce Co Inc 170 Pearl St South Braintree 85 Mass Fisher Research Laboratory Inc 1961 University Ave Palo Alto Calif FITS ALL—Eagle Electric Mfg Co Inc FIVE IN ONE—All-State Welding Alloys Co Inc S-WAY—Superior Electric Co FIXTURE FASHIONS—Moe Light Div Thomas Indus-

tries Inc
FLAME-STOP—Phelps Dodge Copper Products Corp
FLAMENOL—General Electric Co Construction Ma-

terials Div
FLASH-GLO—Tedcar Products Co
FLAVOR SEAL—Fresh'nd-Aire Div
FLEET-LINE—Brown-Brockmeyer Co
FLEETWELDER—Lincoln Electric Co CoCo

Fleron (M M) & Son 1220 Yardley Rd Morrisville Pa Fletcher Manufacturing Co 302 East Second St Dayton 2 Ohio Fleur-O-Lier Mfrs 2116 Keith Bldg Cleveland 15

Ohio

FLEX-A-PUWER—General Electric Co
FLEX-A-POWER—General Electric Co
semblies Dept
FLEX ALL—Rome Cable Corp
FLEX-ARM—Woodward Machine Co
FLEX-LOY—Charleston Rubber Co
FLEX-LOY—Capewell Mfg Co
FLEX-FLAX—Bogen (David) Co Inc
FLEX-RING—Smith & Serrell Inc
FLEX-SOK—Carborundum Co Stupakoff Div
FLEX-TOM—Gapewell Mfg Co
FLEX-ARM—Genevall Mfg Co
FLEX-ARM—Gamewell Mfg Co
FLEX-ARM—Gamewell Mfg Co
FLEX-RING—Capewell Mfg Co
FLEX-RING—Gapewell Mfg Co
FLEX-RING—Gape

FlexAngle Corp 3760 Oakwood Ave (P 0 Box 418) Youngstown 1 Ohio

FLEXARAY—Duro-Test Corp
FLEXARC—Westinghouse Electric Corp
FLEXARM—Art Specialty Co

FLEXI-SWITCH—Nankervis (Geo L) Co
FLEXIBEL—Acme Lite Products Co
FLEXIBEL—Acme Lite Products Co
FLEXIBEL—Acme Lite Products Co
FLEXIBEL—DuKane Corp
FLEXIBES—Frankel Connector Co
FLEXIAS—Standard Electric Time Co
FLEXIAS—Standard Electric Trime Co
FLEXIAC—National Electric Products Corp
FLEXID—Standard Pressed Steel Co
FLEXO—Art Specialty Co
Flexo International Corp 3720 N Milwaukee Ave
Chicago 41 III
FLEXOLITER—Duro-Test Corp
Flexonics Corp 1430 S Third Ave Maywood III
FLEXIFIEL—Columbia Cable & Electric Corp
FLEXSHELD—American Electric Carle Co
FLEXSHELD—American Electric Products Corp
FLEXSHELD—American Electric Products Corp
FLIPS—National Electric Corp
FLIPS—National Electric Corp
FLIPS—TITE—Royal Electric Corp
FLIPS—TITE—Royal Electric Corp
FLIPS—Westinghouse Electric Corp
FLIPS—TITE—Royal Electric Corp
FLOV—LITE—Burton Mfg Co
FLO-PAL—Acme Industries Inc
FLOW-MIER—Wheeler Reflector Co
FLO-PAL—Acme Industries Inc
FLOW-COLD—Acme Industries Inc
FLOW-COLD—Acme Industries Inc
FLOW-TEMP—Acme Industries Inc
FLOW-Flower (D B) Mfg Co 1217 Spring Garden St Phila
23 Pa
Flower Mfg Co Inc—4ee Flower (D B) Mfg Co
FLOWRATOR—Fischer & Porter Co
FLOUNGER—Stander Electric Tools
FLUID SHAFT—Reuland Electric Co
FLUO LITER—Guth (Edwin F) Co
FLUO LITER—Guth (Edwin F) Co
FLUO RD EL—Segil (L J) Co
FLUORO-0-TESTER—Electric Re-Light Co
FLUORRO-Lite Co Evans Terminal (North Broad St)
Hillside 5 New Jersey
Fluorescent Equipment & Mfg Co
Fluorescent Equipment & Mfg Co
Fluorescent Equipment Supply Co—see K-B Lighting
Mfg Co
Fluorescent Equipment Supply Co—see FLYING FARMER—Line Material Industries McGrawEdison Co.
FOAMFLEX—Phelps Dodge Copper Products Corp
FOAMFLINE—Plastoid Corp
FOAMFLINE—Plastoid Corp
FOCALITE—Amplex Corp
FOCALITE—Amplex Corp
FOCUS LOK-Westinghouse Electric Corp
FOLD-A-WAY—Patent Scaffolding Co Inc
FOIsom Co Inc. 3104 Oak Lane Dallas 26 Tex
FOOTROL—General Control Co
FORCE-FLO—Trane Commany
Foredom Electric Co 27 Park PI NY 7 NY
FOREMAN—Curtis Lighting Inc
FORELAMP—General Electric Co Appartus Sales
Division Division
FORMEX—General Electric Co Construction Materials FORMEX—General Electric to Construction Div FORMEZE—General Cable Corp FORMLON—General Cable Corp FORMVAR—Anaconda Wire & Cable Corp FORMVAR—General Cable Corp Forston Co 1400 Conti St Houston 2 Tex FORM Control County Control Con FORTY-SIXTY—Curtis Lighting Inc FORWAY—U S Expansion Bolt Co FORMAY—U S Expansion Bolt Co
FORMAY—U S Expansion Bolt Co
FOSTERITE—Westinghouse Electric Corp
Fostoria Pressed Steel Corp N Main St
Ohio
FOTA-LITE—Corning Glass Works
FOTOELECTRIC—Worner Electronics Devices
FOUNDROMATIC—Allis-Chalmers Mfg Co
4 POINT—Nye Tool Co
FOUR-STAR—Johns-Manville
FOX Gun Co—see Fox Products Co
Fox Gun Co—see Fox Fox Gun Co
France Mfg Co 10325 Berea Rd Cleveland 2 Ohio
FRANKLE—Waldron (John) Corp
Francelite Co—see Federal Lighting Corp
Frankel Connector Co 27 Vestry St New York 13
New York
FRANKLIN—Bernard-Franklin Co Inc
Franklin Electric Co Inc 400 E Spring St Bluffton
Ind
Freeman (Eugene John) & Co—see Multi-Matic Corp Ind
Freeman (Eugene John) & Co—se Multi-Matic Corp
FREEMAN UNIVERSAL—Arco Mfg Co
FREEZ-RITE—Bailey & Perkins Co
Frestind-Aire Div Cory Corp
Frestind-Aire Div Cory Corp 221 N LaSalle St
Chicago III
Frick Co Waynesboro Pa
Frick-Gallagher Mfg Co 110 S Michigan Ave Wellston Office State of St ton Ohio
FRICTION SET—Ideal-Simplet Fittings Inc
Frigid Inc 128-168 32 St Brooklyn 32 New York
Frigidaire Div General Motors Corp 300 Taylor St
Dayton 1 Ohio

FRIGIDFLEX—Hatfield Wire and Cable Div Continental Copper and Steel Industries Inc Frink Corp (27-01 Bridge Plaza North LIC NY Frisble (HC) Co 1120 E Pico Bind Los Angeles 21 Calif
FROG-LEC—Allis-Chalmers Mfg Co
FULL-O-LITE—Fullerton Manufacturing Corp
FULL-O-PEP—Standard Electric Co Inc
Fullerton Mfg Corp Willard Rd Norwalk Conn
Fullman Manufacturing Co 1209-1215 Jefferson St
Latrobe Pennsylvania Fullman Manufacturing Co 1209-1215 Jefferson
Latrobe Pennsylvania
Furnas Electric Co 1067 McKee St Batavia III
FUSETRON—Bussmann Manufacturing Co
FUSISTOR—S & C Electric Company
FUSTAT—Bussmann Mfg Div McGraw-Edison Co
FUTURA—Farles Lamp Div
FUTURA—Farles Lamp Div
FUTURA—Farles Lamp Div
FUTURA—Guth (Edwin F) Company
FYBEROID—Wilmington Fibre Specialty Co
FYR-CRY—SAFA Alarm Div G

G-C—General Cement Manufacturing Co G-E—General Electric Co G-H—Girard-Hopkins G. L.—Lidseen of North Carolina Inc GS—General Scientific Equipment Co GSF—General Steel Fittings Co G-5-T—Gult (Edwin F) Co G/W—Great Western Div Interlectric Corp G & W Electric Specialty Co 3500 W 127 St Blue G & W Electric Specialty Co 3500 W 127 St Blue Island III
GACOR—Lagle Electric Mfg Co Inc.
Gaines-Collins Co Quijada Tool Div—see Collins Machinery Co GALV-KROM—Steel City Electric Co GALV-KROM—Steel City Electric Co Galvin Mfg Corp—see Motorola Inc GALVINOLEUM—Rust-Oleum Corp Gamewell Co Newton Upper Falls 64 Mass GAR-SEE-LITE—Woodward Machine Co Gary Lighting Div GARAGE-LITE—Woodward Machine Co Gary Lighting Div Garden City Flating & Mfg Co 2475 Eleston Ave Chicago 47 III
Garden City Fan Co 801 N Eighth St Niles Mich Garden City Flating & Mfg Co—see Garcy Lighting Div Garden City Flating & Mfg Co—see Garcy Lighting Div GARDINER—Federated Metals Div American Smelt-ing & Refining Co Gardner Electric Mfg Co—see Federal Pacific Electric carroner Electric Mrg Co—see Federal Pacific Electric
Co
Gardner Products Co 15244 Aubrey Detroit 39 Mich
GARDSMAN—Taco West Corp
GARDSMAN—West Instrument Corp
GARDSMAN—West Instrument Corp
Gaston Power Tools 999 Ridge Rd
Gatter Product Co 2090 Barnes Ave Bronx 62 NY
Gateway Engineering Co 3233 W Grand Ave Chicago
51 III
GEAREDUCERS—Electra Motors Inc
Gedney Electric Co Americas Bidg Radio City NY
20 NY
GEMRRICH—Rockwell (W S) Company
Geier (P A)—see Royal Vacuum Cleaner Co
GEM DANDY—Buckels (Chris) Inc
Gem Electric Mrg Co Inc 237 37th St Brooklyn NY
Gemoc Electric Co 25685 W Eight Mile Rd Detroit
40 Mich
GENCATEL—General Cable Corp
GENCATHENE—General Cable Corp
GENCATHOL—General Cable Corp GENCATROL—General Cable Corp GENEMOTOR—Carter Motor Co General Alliance Corp 2105 Moore St San Diego Calif General Blower Co 8610 Ferris Ave Morton Grove III General Cable Corp General Cable Corp Codult Corp General Cernent Mfg Co 400 S Wyman St Rockford TH General Control Co 1200 Soldiers Field Rd Boston
34 Mass
General Controls Co 801 Allen Ave Glendale Calif
General Electric Co Conditioning Div Commercial & Industrial ir Conditioning Dept 5 Lawrence St Bloomfield Air NJ
Air Conditioning Div Home Heating & Cooling
Dept Troup Highway Tyler Tex
Air Conditioning Div Weathertron Dept 5 Lawrence St Bloomfield NJ
Apparatus Sales Div Schenectady 5 NY
Appliance & Television Receiver Div Room Air
Conditioner Dept Appliance Park Louisville 1 Ky
Chemical & Metallurgical Div Chemical Materials
Dept Insulating Materials Sec 24 River Rd
Schenectady 5 NY
Industrial Electronics Div Technical Products
Dept Electronics Park Syracuse NY
Industrial Power Components Div Circuit Protective Devices Dept 41 Woodford Ave Plainville
Conn Industrial Power Components Div Distribution Assemblies Dept 41 Woodford Ave Plainville Conn
Lamp Div Large Lamp Dept Nela Park CleveLand Ohio
Lamp Div Miniature Lamp Dept Nela Park
Cleveland Ohio
Chemical & Metallurgical Div Laminated Products
Dept Coshocton Ohio
Chemical & Metallurgical Div Silicone Products
Dept Waterford NY

General Electric Co (cont)
Construction Materials Div Wire & Cable Dept
1285 Boston Ave Bridgeport 2 Conn
Construction Materials Div Conduit Products Dept
1285 Boston Ave Bridgeport 2 Conn
Construction Materials Div Wiring Device Dept
95 Nathaway St Providence RI
General Hardware Mfg Co Inc 80 White St New York
13 New York
General Insulated Wire Works Inc 69 Gordon Ave
General Lighting Co 148 McKibbin St Brooklyn 6
General Lighting Co 248 McKibbin St Brooklyn 6
General Lighting Co 248 McKibbin St Brooklyn 6 ueneral Lignting Co 243 McKilblin St Brooklyn 6
NY
General Luminescent Corp—see Pollak Luminescent
Corp
General Metals Inc 858 Goldsboro Greensboro NC
General Radio Co 275 Massachusetts Ave Cambridge
39 Mass
General Scientific Equipment Co 7516 Limeklin Pike
Philadelphia 50 Pa
General Steel Fittings Co 1321 21st St Racine Wis
General Switch Co 45 Roebling St Brooklyn 11 NY
GENESCOPE—Simpson Electric Co
GENIE—Alliance Mfg Co Inc
GEON—Goodrich (B F) Chemical Co
Geophysical Instrument Co—see Georator Corp
Georator Corp Manassas Virginia
Geringer & Sons Mfg Corp Peekskill NY
Gets-A-Lite Co 3865 N Milwaukee Ave
Chicago 41
Illi Milli Co 1910 Biodmost Clarie NE Alliante Gibson Mfg Co 1919 Piedmont Circle NE Atlanta Ga on Refrigerator Co 515-615 W Williams St Glisson Refrigerator Co 515-615 W Williams St Greenville Mich GILLCO—Gill Glass and Fixture Co GIMBAL RINGS—Alexander-Tagg Industries Inc GIMBALITES—Alexander-Tagg Industries Inc Girard-Hopkins 1000 40th Ave Oakland 1 Callf GIRAFFE—Pitman Mfg Co Gisholt Machine Co 1245 E Washington Ave Madison 10 Mills 10 Mi GIRAFFE—Pitman Mfg Co
Gisholt Machine Co 1245 E Washington Ave Madison
10 Wis
GLADIRON—Thor Corp
GLAS BAKE—McKee Div Thatcher Glass Mfg Co Inc
GLASSRIL—Star Expansion Bolt Co
GLASSEAL—Pyramid Electric Co
GLASSEAL—Pyramid Electric Co
GLASSHAT—Continental Radiant Glass Heating Corp
GLASSURFACED—Kirlin Company
GLASTERRA—Chase & Sons Inc
Glastic Corp 4321 Glenridge Rd Cleveland 21 Ohio
GLAZON—Triangle Conduict & Cable Co Inc
Glastic Corp 4321 Glenridge Rd Cleveland 21 Ohio
GLAZON—Triangle Conduict & Cable Co Inc
Glason Reel Corp 740 N Plankinton Ave Milwaukee
3 Wis
Gleason Sales Co Inc 5809 W Montrose Ave Chicago
34 III
GLENDALE—King Refrigerator Corp
Glenn Co—see M & T Welding Products Corp
Glenn Equipment Co—see Glenn Co
Glonen Equipment Co—see Glenn Co
GLO-COIL—Eagle Electric Mfg Co Inc
GLO-COIL—Eagle Electric Mfg Co Inc
GLO-GLOP-INT—Vermaline Products Co
GLO-POINT—Vermaline Products Co
GLO-RAY—Curits Lighting Inc
GLO-RAY—Curits Lighting Inc
GLO-RITE—Phillips (Scar) Co
Globar Div Carborundum Co Niagara Falls NY
Globe Lighting Products Inc
GLOW-TIPE—Phillips (Oscar) Co
Globar Div Carborundum Co Niagara Falls NY
Globe Lighting Products Inc
GLOW-CROWN—Ploneer Gen—E-Motor Co
GLOW-LITE—Spencer Industries
GLOW-LITE—Spencer Industries
GLOW-LITE—Larco Inc
GLYPTAL—General Electric Co
Godfrey Mfg Co 162 South St Hartford Wis
GOCCTTERP. Goetz (J F) Mfg Co 162 South St Hartford Wis GOETTER—Revolvator Co GOLD—Kaiser Aluminum & Chemical Sales Inc GOLD—National Acme Co GOLD-N-RING—National Acme Co GOLD-O-MATIC—Luxor Lighting Products Inc GOLD MEDAL—Patent Scaffolding Co Inc GOLD SEAL—Jenkins Brothers Rubber Div Goldak Inc 1544 E West Glenoaks Blvd Glendale 1 California California
Goldberg & O'Brien Elec Co—see Ther Electric &
Machine Works
GOLDEN SUMBURST—Globe Lighting Products Inc
Good Mfg Co Inc 1015 N Haisted St Chicago 22 Till Goodail Rubber Co 493 Whitehead Rd Trenton NJ Goodrich (8 F) Chemical Co 3135 Euclid Ave Cleveland 15 Ohio Goodrich Electric Co-see Appleton Electric Co Goshen Churm & Ladder Inc Goshen Churm & Ladder Inc Goshen Indiana GRAMIX—United States Graphite Co GOTHAM—U S Gauge Div Gould-National Batteries Inc Trenton 7 NJ GOVOHM—Electric Regulator Corp Graham (Phillip E) Co Inc 1262 Udell St (P O Box 5824) Indianapoiis 23 Ind Graham Mfg Corp 152 Second Ave Needham Hts 94 Mass ΪΪΙ Mass Transmissions Inc—see Jordan Co Inc Gran-Cal Inc—see Calvert Co GRAPHALIO—Graphite Metallizing Corp GRAPHALIO—Graphite Metallizing Corp GRAPELITE—Guth (Edwin F) Company Gray Instrument Co 200 E Church Lane Phila 44

Pa GRAY-PERFECTION—United States Rubber Co Graybar Electric Co Inc 420 Lexington Ave Vork 17 New York Grayhill Inc 551 Hilligrove Ave La Grange IIII GREA-NO—Great Northern Manufacturing Corp Great Northern Mfg Corp 1056 N Wood St Chicago 22 III

Great Western Div Interlectric Corp 1401 Lexington Ave Warren Pa een Ball Bearing Co 9518 Cassius Ave Cleveland Green Ball Bearing to 70.10 cassills are contracting Co Greenlee Tool Co 2136 Twelfth St. Rockford III Grebach Instruments Corp Metuchen NJ Greenlee Tool Co 1.00 free Metuchen NJ Corper-Hendry Co Inc 1401-17 W Carroll Ave Chicago 7 III Grinnell Co Inc 260 W Exchange St. Providence 2 Grinnell Co Inc 260 W Exchange St Providence 2 RII
Grinnell-Saunders—see Grinnell Company Inc
GRIP-EZE—Phelps Dodge Copper Products Corp
GRIP-FLEX-Copperweld Steel Co
GRIP-KLIP—Excel Fuse Co
GRIP-KLIP—Specialties Inc
GRIP-O-MATIC—Owationa Tool Co
Grip-Tite Mfg Co 115 W Jefferson St Winterset
Iowa Towa
GRIP-TYPE—Thiel Tool & Engineering Co
GRIPO—Barrett Varnish Co
GRIZZLY—Pucel Enterprises Inc
GRIZZLY—Kalser Aluminum & Chemical Sales Inc
GRO-QUICK—Wrap-On Co
Grotz (Anthony) & Associates—see Gleason Sales Co GROUND-GARD-Anderson (Albert & J M) Mfg Co GROUND-GAME—Anderson (Albert & J m) mrg to GROUND-OHMER—Sticht (Herman H) Co Inc GROUNDOMETER—Borden Engineering Div M J John-son Alrcraft Engineering Co GROUNDOMETERS—Borden Engineering Co GROUNDOMETERS—Borden Eigenering of GROUNDOLET—Crouse-Hinds Co Gruber Bros Inc 125 S First St Brooklyn 11 NY Gruber Lighting—see Gruber Bros Inc GRYPHON—Brook Motor Corp GUARANTEE—Patrick & Wilkins Co GUARANTEE—Patrick & Wilkins Co
GUARDIAN—Dura Electric Lamp Co Inc
GUARDIAN—Dura Electric Lamp Co Inc
GUARDIAN—General Cable Corp
Guardian Electric Mfg Co 1621 W Walnut St Chicago 12 III
GUARDSMAN—Master Rule Mfg Co Inc
Guggemos KIO & Co—see Kemworth Co
GUIDERAY—Everwarm Inc
GUIDEROL—McGIII Manufacturing Co Inc
GUILLOTINE—Manca Mfg Co
GULF STREAM—Signal Electric Div King-Seeley
Corp Corp Gulton Industries Inc Alkaline Battery Div Metuchen NJ GURNEY—Marlin-Rockwell Corp GUSCO—Gustaveson Inc Gustavesant Inc 8600 Chestnut St Kansas City 30 Missouri Guth (Edwin F) Co 2615 Washington Blvd St Guth (Edwin F) Co 2615 Washington Bird St
Louis 3 Mo
GUTHLITE—Guth (Edwin F) Company
GUY-GRIP—Preformed Line Products Co
Guyan Machinery Co Inc Box 150 Logan W Va
Gwillian Co 360 Furman St Brooklyn 1 New York
GYMLITES—Steber Mfg Co
GYRALITE—Pyle-National Co GYRO-LITE—Swivelier Co Inc GYROL—American Blower Corp

H

H-B Instrument Co 4303 American St Phila 40 Pa H & H—Arrow-Hart & Hegeman Electric Co HI—Hollub Industries Inc H-P—Hatheway & Patterson Co Inc H-P—Hatheway & Patterson Co Inc Haartz-Mason Inc 270 Pleasant St Watertown 72 Mass Hatheway & Patterson Co Inc Habits Hatheway & Patterson Co Inc Habits Hatheway & Patterson Co Person Habits Hatheway & Patterson Copper Products Corp Habits Hatheway & Patterson Copper Products Corp Habits Hatheway & Minnender Copper Products Corp Hadeo Aluminum Products Co P 0 Box 128 Littlestown Pa Haertal (Walter) Co 2840 4th Ave So Minneapolis Minne Haley (R G) & Co Inc 767 Spitzer Bidg Toledo 4 Ohio Haley (R G) & Co Inc 767 Spitzer Bidg Toledo 4 Ohio Haley (R G) International Corp Inc—see Haley (R G) & Co Inc HallDE—Turner Brass Works HAM-R-TOOL—Fastway Fasteners Inc HAM-TENNA—Illumitronic Engineering Hamilton Caster & Mfg Co 1519 Dixle Highway Hamilton Ohio Hamilton Fan O

Handy Angle Div Lug-All Co 355 Lancaster Ave Haverford Pa HANDY-BENDY—Tal Bender Inc HANDY-GENDY—Tal Bender Inc HANDY-GENDY—Tal Bender Inc HANDY-GENTY—Tal Bender Inc HANDY-TUBE EXPANDO—Knuth Engineering Co HANGOLITE—Line Material Industrial Industrial Handscraft Co Control Div Reedsburg Wis Hansen Mfg Co Inc R R 1 Princeton Ind HAP-E-LITE—Alkco Mfg Co HARGRAFT—Harvey Aluminum Harder Chonald C: Co 3710 Midway Dr San Diego 10 Calif Hardman (H V) Co Inc 571 Cortlandt St Belle-Hardman (H V) Co Inc 571 Cortlandt St Belle-Hardman (H V) Co Inc 571 Cortlandt St Belle-Hardman (H V) Co Inc 571 Cortlandt St Belle-Hardwardman (H V) Co Inc Hardwardman (H V) Co Inc Hardwa Washington Harper Electric Furnace Corp 39 River St Buffalo 2 New York Hart & Hegeman—see Arrow-Hart & Hegeman Electric Hart & reyenant Co Co Hart Mfg Co 164 Bartholomew Ave Hartford Conn HART-LOCK—Arrow-Hart & Hegeman Electric Co Hart Mfg Co 110 Bartholomew Ave Hartford Conn HARTFORD—Miller Co Hartford Blower Co—see Sterling Blower Co Hartzeil Propeller Fan Co S Englert Ave Piqua HARTZITE—Hartzeli Propeller Fan Co HARVEL—Minnesota Mining & Mfg Co Irvington Div HASCO—National Band & Tag Co Hasco Electric Corp 30 Grove Ave New Rochelle NY Hastings Air Conditioning Co Inc 108 S Colorado Ave Hastings Air Conditioning Co Inc 108 S Colorado Ave Hastings Neb
HATEMP—Hatfield Wire and Cable Div Continental Cooper and Steel Industries Inc
HATEX—Continental Cooper & Steel Indus Inc Hatfield Wire & Cable Div
Hatfield Rubber Works—see Hatfield Wire and Cable Div Continental Cooper and Steel Industries Inc
Hatfield Wire and Cable Div Continental Cooper and Steel Industries Inc
Hatfield Wire and Cable Div Continental Cooper and Steel Industries Inc
Hatfield Wire and Cable Div Continental Cooper and Steel Industries Inc 487 Hillside Ave Hillside 5 field Wire & Cable Div Hatheway & Patterson Co Inc 15 County St Mans-field Mass HATFLEX-Continental Copper & Steel Indus Inc Hatfield Mass
HATSEAL—Hatfield Wire and Cable Div Continental
Copper and Steel Industries Inc
HATVINOL—Hatfield Wire and Cable Div Continental
Copper and Steel Industries Inc
HAVEN'S—Kelin (Mathias) & Sons
Hayden Twist Drill Co Manila Ark
Haydon (A W) Co 232 N Elm St Waterbury Conn
Haydon Mfg Co Inc 4100 East Elm St Torrington Hayes (C I) Inc 800 Wellington Ave Cranston 10 RI
HAYMOLITE—Steber Manufacturing Co
HAYS-COCHRANE—Penn Industrial Instrument Div
Burgess Manning Co
Hays Mfg Co Industrial Sales Div 12th and Liberty
Sts Erie 6 Pa
HAYS-PENN—Penn Industrial Instrument Div Burgess
Manning Co Manning Co
HAZACORD—Okonite Co
HAZACORD—Wire Works—see Okonite Co
HAZACORDHEK—Westline Products Div Western Litho-HAZACORD—Okonibe Co
HAZAROCHEK—Westline Products Div Western Lithograph Co
HAZARDSTRIPE—Westline Products Div Western Lithograph Co
HAZARDSTRIPE—Westline Products Div Western Lithograph Co
HAZARDSTRIPE—Westline Products Div Western Lithograph Co
HAZARTEL—Okonibe Co
HEAT—ALTE—NuTone Inc
HEAT HAZE—Moken Inc
HEAT—NITE—Ampere Industries
HEAT—REAN—Dominion Electric Corp
HEAT—REAN—Dominion Electric Corp
HEAT—BRAN—Dominion Electric Corp
HEAT—BRAN—Dominion Inc
HEAT—BRAN—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ—BRAN—READ 12 Ohio
Hendrix Wire & Cable Corp Milford NH
Henkel-Clauss Co—see Clauss Cutlery Co
HERCULES—Acromark Co
HERCULES—Whitman & Barnes Div
HERCULON—Dossert Mfg Corp

Hertner Electric Co 12690 Elmwood Ave Cleveland Hertiner Electric Co 12590 Elimwood Ave Clevela 11 Ohio HESS-BRIGHT—S K F Industries Inc Hesse (W A) & Co—see Hesse Products Co Hesse Products Co 600 W Seventh St Reno New Hessel (W F) Co Inc 74 Beekman St NY 38 NY Hevi Duty Electric Co P O Box 563 Milwauksee Wix Hewitt-Robins Inc 666 Glenbrook Rd Stamford Connecticut Hewson Co Inc 43 Broad St Newark 2 NJ Hewson Co Inc HEX DRIVERS—Hunter (R N) Sales Co Inc HEX DRIVERS—Hunter (R N) Sales Co Inc Hexacon Electric Co 161 West Clay Ave Roselle Park New Jersey Hexal Products Inc 2741 Ninth St Berkeley 10 Hexcal Products Inc 2741 Ninth St Berkeley 10
Calif
HEXCLAD—Hexacon Electric Co
HEXSEAL—Automatic and Precision Mfg Co
HEXTHODE—Luxor Lighting Products Inc
HEYCO—Heyman Manufacturing Co
Heyman Mfg Co Kenilworth 20 NJ
HI—Holub Industries Inc
HI—BALL—Trippe Mfg Co
HI-CLAMPS—Holub Industries Inc
HI-CAP—Bussmann Mfg Co
HI-CLAMPS—Holub Industries Inc
HI-CORE—Alpha Metals Inc
Kent Lighting Corp
HI-FLOOD—Radiant Lamp Corp
HI-FLUX—Annis (R B) Co
HI-HAT—Litecraft Mfg Co Inc
HI-LETRIC—Maginniss Power Tool Co
HI-LITE—Litecraft Manufacturing Corp
HI-LITE—Litecraft Manufacturing Corp
HI-LITE—Litecraft Manufacturing Corp
HI-LITE—Litecraft Manufacturing Corp
HI-LITE—Fairies Lamp Div General Lamps Mfg
Corp
LI-MEG—Dolph (John C) Co Corp HI-MEG-Dolph (John C) Co HI-MEG.—Dolph (John C) Co
HI-NECN.—Molub Industries Inc
HI-RANGER.—Mobile Aerial Towers Inc
HI-RANGER.—Mobile Aerial Towers Inc
HI-RACH.—Economy Engineering Company
HI-SPEED.—Dockson Corp
HI-SPEED.—Molly Corp
HI-SPEED.—Radiant Lamp Corp
HI-STRENGTH.—Blackburn (Jasper) Corp
HI-STRENGTH.—Blackburn (Jasper) Corp
HI-SUPERITIE—Engelhard (Charles) Inc
HI TEMP.—Rockbestos Products Corp
HI-TEMP.—Rome Cable Corp
HI-TEMP.—Rome Cable Corp
HI-THERM.—Dolph (John C) Co
HI-TORK.—Electro-Mechanical Instrument Co
HI-TORK.—Holub Industries Inc HI-TORK—Electro-Mechanical Instrument Co
HI-TMIST—Holub Industries Inc
HI-VALUE—Johns-Marwille
HI-VOLT—Industrial Devices Inc
HIBAY—Holophane Company Inc
HIGKOR Electrical Instrument Co 10514 Depont Ave
Cleveland 8 Ohio
HICKORY—Precision Manufacturing Co Inc
HICO—Hastings Instrument Co Inc
HICO—Hastings Instrument Co Inc
HICYCLE—Chicago Pneumatic Tool Co
HIDE-AWAY—Bryant Heater Div Affiliated Gas Equipt
Inc HIDE-AWAY—Dryant Heater Div Amiliated Gas Equipt.
Inc
HIGH BAY—Curtis Lighting Inc
HIGH SPEED—Capewell Mfg Co
HIGHLITE—Associated Lighting Service
Highway Trailer Co 405 East Fulton St Edgerton
Wis Highway Trailer Co 905 East Fusion of Wis Wis HILAG—Ware Fuse Corp Hill Transformer Co Inc 1030 Washington St San Carlos Callf Hillodale Commutator Co—HILO—Driver (Wilber B) Co HILTI—Electro Arc Sales Co HILTI—Electro Arc Sales Co Hill Rapid Fastening Systems Inc 55 Van Dam St NY 13 NY Hindle Transformer Co Inc Woods Church Rd Flemington NJ HINJON—Thomas & Betts Co HIPOT—Peschel Electronics Inc HIPPO—Mueller Electric Co HIPOT—Peschel Electronics Inc HIPPO—Mueller Electric Co Hirschmann-Pohle Co Inc 300 Lent Ave LeRoy NY HITEST—American Nut & Bolt Fastener Co Hobart Bros Hobart Square Troy 1 Ohio HOBBY—Carlson & Sullivan Inc Hoffman Engineering Corp 1050 Tyler St Anoka Minn HOIST-ALL—Coffing Hoist Div Duff-Norton Co Hol-Dem Electric Fencer Co—see Electric Service Systems Inc Holan (J H) Corp 4100 W 150 St Cleveland 11 Holan (J H) Corp 4100 W 150 St Cleveland 11
Ohlo
Ohlo
Ohlo
Metal Fabricating and Finishing Corp—see
House-O-Lite Corp
HOLD-FAST—Chance Co A B
HOLD-IT—Arro Expansion Bolt Co
HOLD-ITE—Titchener (E H) & Co
HOLD-ITE—Titchener (E H) & Co
HOLDA-LITE—Hoffman Engineering Corp
HOLDFAST—Ludlow Mfg & Sales Co
HOLDTITE—United States Rubber Co
HOLE-SHOOTER—Milvaukee Electric Tool Corp
HOLFAST—Dayton Rubber Co
HOLEGUN—Black & Decker Mfg Co
HOLDUN—Black & Decker Mfg Co HOLIDAY—Day-Brite Lighting Inc HOLIDAY—Fairies Lamp Div General Lamps Mfg HOLIDAY—Fairles Lamp DIV General Lamps mry Corp
Outpay—General Lamps Mrg Corp
HOLIDAY—General Lamps Mrg Corp
Hollingsworth Co Solderless Terminal Div Box 430
Phoenixville Pa
HOLLIWOOD—Finders Manufacturing Co
HOLLOSHAFT—U S Electrical Motors Inc
Hollywood Transformer Co—see Transformer Engineers
HOLDFLUX—Holophane Company Inc
Holophane Co Inc 342 Madison Ave NY 17 NY
HOLTITE—American Brass Co Holtzer-Cabot Div National Pneumatic Co Inc 125
Amory St Boston 19 Mass
Holtzer-Cabot Electric Co—see Holtzer-Cabot Div National Pueumatic Co Inc
Holub Industries Inc 442 Elm St Sycamore III
Homelite Corp—see Homelite Div Textron Inc
Homelite Div Textron Inc 67 Riversdale Ave Port
Chester NY
Homer Commutator Co—see Toledo Commutator Co
HOMOCORD—Raybeston-Manhattan Inc
HOMOFLEK—Raybeston-Manhattan Inc
HOMOFLEK—Raybeston-Manhattan Inc
HOME MIC —see Bell Electric Co
HONEYLITE—Hexcel Products Inc
Howar Effic Co—see Kingston Conley Inc
Howar Efficie Inc 347 Greenwich St NY 13 NY
Hope Electrical Products Co Inc 27 Long Ave Hillside
NJ Hope Electrical Products to and NJ
HORSE HEAD—New Jersey Zinc Co
Hose-McCann Corp—see Hose-McCann Telephone Co
Hose-McCann Telephone Co Inc 25th St & 3rd Ave
Brookiny 32 NY
HOSPITAL-LITE—Swivelier Co Inc

Third St Winona Minn Brooklyn 32 NY
HOSPITAL-LITE—Swivelier Co Inc
HOSPITALITY LIGHT—Versen (Kurt) Co
Hassfeld Mfg Co 460 W Third St Winona Minn
HOT ROD—Pyrosil Inc
HOTABLE—Salton Mfg Co Inc
HOTKOTE—Mark (Clayton) & Co
HOTPACK—Electric Hotpack Co Inc
HOTRAY—Salton Mfg Co Inc
HOTRAY—Salton Mfg Co Inc
HOTRAY—Salton Mfg Co Inc
HOTRAY—Salton Mfg Co Inc
House-O-Lite Corp 2430 S Ashland Ave Chicago 7 III
Howard Electric Co 1950 Ruby St Melrose Park III
Howard Industries Inc 1760 State St. Racine Wis
Howell-Dor—see Howell Mfg Co
Howell Electric Motors Co 409 North Rosevelt St
Howell Michigan
Howell Mfg Co 21 N Morehall Rd Paoli Pa
HOWETS—Klein (Mathias) & Sons
Hoyt—Burton-Rogers Company
Hoyt Electrical Instrument Works Inc—see Burton-Rogers Company Rogers Co
Hoyt Manufacturing Corp Forge Rd Westport Mas-Heys: Manufacturing Corp Forge Rd Westport Massachusetts
Hub Electric Co. 2255 W Grand Ave. Chicago 12 III
HUB MOUNT—Hubbard & Co.
Hubbard & Co. 6301 Butler St. Pittsburgh 1 Pa.
Hubbard & Co. 6301 Butler St. Pittsburgh 1 Pa.
Hubbard Spool Co—see American Pulley Co.
Hubbard Hurvey) Inc. State St. & Bostwick Ave.
Bridgeport 2 Conn.
HUBBELLOCK—Hubbard & Co.
HUBBRAK—Hubbard & Co.
HUBBRAK—Hubbard & Co.
HUBRAK—Hubbard & Co.
Hudson Lamp Co. 528 Elm St. Kearny NJ.
Huenfeld Co. Engineered Products Div. 2701 Spring.
Grove Ave. Cincinnat1 25 Ohlo
Hughes Products. Hughes Aircraft Co.
Hughes Products. Hughes Aircraft Co.
Hughes & Phillips Inc. 3200 North San Fernando.
Bivd Burbank Calif
Hullhorst Micro-Tool Co—see Hullhorst Tools Inc.
Hullhorst Micro-Tool Co—see Hullhorst Tools Inc.
Divide Micro-Tool Spring Products. Co. Hullhorst Tools Inc 1742 recorate
Ohio
HUMIDOMIST—Supreme Electric Products Co
HUMPORIVE—Thiel Tool & Engineering Co
Humter (H D) & Co—see Hunter Tools
Hunter Div Robbins & Myers Inc 2500 Frisco Ave
Memphis 14 Tenn
Hunter Fan & Ventilating Co—see Hunter Div
Hunter (R N) Sales Co—see Hunter Tools
Hunter Tools 9851 Alburtis St Santa Fe Springs
Calif Cailf
Huntsman Welding Shield Co—see Kedman Co
Hupp Motor Car Corp—Perfection Industries Div
HUPP-WATTSAUER—Globe Stamping Div Hupp Corp
Huppert (K H) Co 6830 S Cottage Grove Ave Chicago 37 III
HUSHMUSH—Carey Mfg Co Philip
HUSKIE—Mercury Manufacturing Co
HUSKY—Price Electric Corp
Husky Products Inc 5300 Vine St Cincinnati 17
Ohio

O Hussey (C G) & Co 2850 Second Ave Pittsburgh Hussey (C G) & Co 2850 Second Ave Pittsburgh 19 Pa HY-A-SIL—Miller (Sanford) Co HY-LOAD—Hyatt Bearings Div General Motors Corp HY-LITER—Gath (Edwin F) Co HY-RE-FLEC—Globe Lighting Products Inc HY-SOL—Charleston Rubber Co HY-TIN—Farrelloy Company Hyatt Bearings Div General Motors Corp Harrison NJ HYCASTE—Chisholm-Ryder Co Inc Premax Products Div HYCASTE—Chishoim-Ryder Co Inc Premax Products
Div
HYDENT—Burndy Corp
HYDRA-POWER—Tal Bending Equipment Inc
HYDRAGPIP—Armstrong-Bray & Co
HYDRAKOTE—Hatfield Wire and Cable Div
nental Copper and Steel Industries Inc
HYDRALLDY—Olun (A L) Co Inc
HYDRALDY—Olun (A L) Co Inc
HYDRALDY—Hatfield Wire and Cable Div
nental Copper and Steel Industries Inc
HYDRATEMP—Hatfield Wire and Cable Div
nental Copper and Steel Industries Inc
HYDRATUBE—Recora Co
HYDRO—HAwwell Equipment Co Inc
HYDRO—HAwwell Equipment Co Inc
HYDRO—HICA—Bell & Gossett Co
HYDRO—HICA—Bell & Gossett Co
HYDRO—HERM—Paranite Wire & Cable Div Essex
Wire Corp Wire Corp
HYDROLECTRIC—Lift Trucks Inc
HYDROLIFT—Lift Trucks Inc
HYDROSEAL—Paranite Wire & Cable Div Essex Wire Corp Corp Corp Corp HVDROSEC—Farante Wire Corp HVDROSEC—Kalser Aluminum & Chemical Sales Inc HVDROSPERSE—Fidelity Chemical Products Corp HYDUTY—Davidson Fan Co Hyborn Manufacturing Co 163 East State St P 0 Box 923 Alliance Ohio

HYLINK—Burndy Corp
HYLUG—Burndy Corp
HYLUG—Burndy Corp
HYPERGORE—Molonay Electric Co
HYPERSIL—Westinghouse Electric Corp
HYPERSI—Westinghouse Electric Corp
HYPOT—Associated Research Inc
HYPRESS—Burndy Corp
HYSPAR—Mildland Paint & Varnish Co
HYSPLICE—Burndy Corp
Hyster Company 2902 Northeast Clackamas Portland
8 Oregon
HYSTERSET—Ward Leonard Electric Co
HYTORE—Burndy Corp
HYTORE—Burndy Corp
HYTORE—Allis-Chalmers Mfg Co
HYVOLT—Crescent Insulated Wire & Cable Co

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I.A.C.—Industrial Automation Corp
IBM—International Business Machines Corp
IDI—Industrial Devices Inc
IEP—Illinois Electric Porcelain Co
IEFCO—International Electric Fence Co Inc
I-EZE—Artistic Lamp Mfg Co Inc
I-LINE—Allen Cooler & Ventilator Inc
IMC—Insulation Manufacturers Corp
IPC—Independent Protection Co Inc
I-T-E Circuit Breaker Co 19th & Hamilton Sts
Philadelphia 30 Pennsylvania
I-T-E Circuit Breaker Co R & IE Equipment Div
Greensburg Pa
I-T-E Circuit Breaker Co Switchgear Div 1924
Hamilton St Philadelphia 30 Pa
I T & T Components Div P 0 Box 412 Clifton
NJ NJ
IWI—Insulation & Wires Inc
IXL—Collyer Insulated Wire Co
Ideal Commutator Dresser Co—see Ideal Industries Inc
Ideal Electric & Manufacturing Co East First St
Mansfield Ohio
Ideal Industries Inc 5136 Park Ave Sycamore III
Ideal-Simplet Fittings Inc 1041 Park Ave Sycamore III
DEALARC—Lincoln Electric Co
IIg Electric Ventilating Co 2850 N Pulaski Rd
Chicano 41 III
ILGETTE—IIg Electric Ventilating Co
ILGVENT—IIg Electric Ventilating Co
Illimois Condenser Co 1616 N Throop St Chicago Illinois (22 III 22 III
Illinois Edison Porcelain McGraw-Edison Co 510
N Pearl St Macomb III
Illinois Electric Porcelain Co—see Illinois Edison
Porcelain McGraw-Edison Co
Illinois Malleable Iron Co—see Appleton Electric Co
Illinois Malleable Iron Co—see Appleton Electric Co
Illinois Malleable Iron Co—see Appleton Electric Co
Illinois Testing Laboratories Inc 420 North La Salle
St Chicago 10 Illinois
Illuminating Engineering Co
Hazel Park Michigan
Illumitronic Engineering 680 East Taylor Ave Sunnyvale Calif
Ilsco Coro 4730 Madison Rd Cincinnat 27 Ohio vale Calif
Ilsco Corp 4730 Madison Rd Cincinnati 27 Ohio
Ilsco Copper Tube & Products Inc—see Ilsco C
IMCOR—Insulation Mfrs Corp
IMMERSATHERM—Mercold Corp IMMCRATHERM—Mercold Corp
IMMP—SATHERM—Mercold Corp
IMMP—Superior Insulating Tape Co
IMMP—Superior Insulating Tape Co
IMMPACTOOL—Ingersoil-Rand
Imperial Lighting Products Latrobe Pa
IMMERIALITE—Imperial Lighting Products Co
IMMERVEX—Crescent Insulated Wire & Cable Co
IMMERVOIL—Crescent Insulated Wire & Cable Co
IMMERVOIL—Crescent Insulated Wire & Cable Co
IMPROV-A-LITE—General Electric Co
IN-BILT—Holophane Company Inc
INCA-LIGHTS—Wilson (J A) Lighting & Display Inc
INCELOID—American Products Mfg Co Inc
INCELOID—American Products Mfg Co Inc
INCELOID—American Products Mfg Co Inc
INCECO—Industrial Engineering & Equipment Co
Inc Inc
Independent Pneumatic Tool Co—see Thor Power Tool
Co ndent Products Co-see Independent Protection Co Inc Co Inc.

Independent Protection Co Inc. 1003-07 Goshen Ind

INDESTRUCTO—National Electric Products Corp

Induction Heating Corp 181 Wythe Ave Brooklyn 11

avv INDUCTROL-General Electric Co INDUCTROL—General Electric Co
INDUCTRONIC—Weston Instruments
INDUCTUNER—Mailory (P R) & Co Inc
Industrial Automation Corp 2415 W Montrose Ave
Chicago III
Industrial Control Panel Co.—see Control Panel Corp
Industrial Devices Inc Edgewater 19 NJ
Industrial Devices Inc Edgewater 19 NJ
Industrial Electric & Mfg Co—see Edison Heatube
Div McGraw Edison Co
Industrial Electrical Works 1509 Chicago St Omaha
2 Neb
Industrial Electronics and Transformer Co—see Inet
Div
Industrial Engineering & Equipment Co Inc 24 Industrial Engineering & Equipment Co Inc 24
Hanley Industrial Ct St Louis 17 Mo
Industrial Engravers Inc 2212 McDonald Ave Brooklyn 23 NY
Industrial Instrument Co—see Seely Instrument Co Inc
Industrial Instruments Inc 89 Commerce Rd Cedar Grove New Jersey Industrial Lamp Corp 14th & Blaine Sts Elkhart Industrial Lamp corp and Indiana Industrial Plastic Fabricators Inc Endicott St Norwood Mass Industrial Tape Corp—see Permacel Tape Corp

INDUSTRIALINER—Duro-Test Corp
INDUSTRIALIST—Curits Lighting Inc
INDUSTRIALIST—Duro-Test Corp
INDUSTRIALIST—Duro-Test Corp
INERTAIRE—Westinghouse Electric Corp
INRETER—Westinghouse Electric Corp
INRETER—Westinghouse Electric Corp
INKIE—Candi-Lite Corp
INKIE—Candi-Lite Corp
INKIE—Candi-Lite Corp
INMARO—Insulation Manufacturers Corp
INNERSPRING—Urell Inc
INSA-LUTE—Sauereism Cements Company
INSANOL—Westinghouse Electric Corp
INSCOT—Solar Electric Corp
INSCOT—Solar Electric Corp
INSTONSECT—Solar Electric Corp
INSTONSECT—Solar Electric Corp
INSTONSECT—France Mfg Co
INSTANT HEAT—Emerson-Pryne Co
INSTON—Copp (T J J) Inc
Insto-Gas Corp 998 E Woodbridge St Detroit 7
Mich
INSTON—Insto-Gas Corp
Instrument Dawelowment Labor Control of the Company
Instrument Dawelowment Labor Control of the Control of t INSTO-Gase Corp 998 E Woodbridge St Detroit 7
Mitch
Mi Screen Div International Business Machines Corp Times Equip-ment Div 590 Madison Ave New York 22 NY International Crossarm Co Inc—see Haley (R G) & Co Inc
International Electric Fence Co Inc Box 650 Albert
Lea Minn
International Fermont Machinery Co Inc Ramcon Ni
International Lighting Mfg Co 1825 N 19th St
St Louis 6 Mo
International Metal Hose Co Ashford Ave Bellevue
Ohio
International Old Russes Co International Oil Burner Co 3800 Park Ave International Oil Burner Co 3800 Park Ave St Louis 10 International Paper Co Wood Preserving Div Kansas City 6 Mo International Register Co 2620 West Washington Blvd Chicago 12 Illinois International Trailer Co Inc 725 North Point Rd Baltimore 6 Md Internate Drop Forge Co Special Products Div 4051 North 27 St Milwaukee 16 Wisconsin INTRA-TEL—General Electric Co Industrial Electronics Div Technical Products Dept INVERTOLITE—Adjustable Fisture Co Invincible Vacuum Cleaner Mfg Co Dover Ohio InvisiBLE Dors-MAN—Dor-O-Matle Div Republic Industries Inc Iona Ventilator Co Inc 2821-29 W Dauphin St Phila 32 Pa 32 Pa IONAIRE-Wesix Electric Heater Co IONAIX—Wesix Electric Heater Co IONIX—Wesix Electric Heater Co IRON CLAD—Boston Woven Hose & Rubber Co IRON CLAD—Everett (E A) Inc IRONCLAD—Exide Industrial Div Electric Storage ROMOLEAD—Extee industrial of Electronics Div 2838
Southeast Ninth Ave Portland 2 Oregon
IRON GRIP—Equipto Div Aurora Equipment Co
IRON MIRE—Arco Mig Co IRON MIKE—Arco Mfg Co
IRRATHENE—General Electric Co
Irvington Varnish & Insulator Co—see Minnesota
Mining and Mfg Co Irvington Div
Irwin Auger Bit Co 92 Grant St Wilmington Ohio
Isert Liobn H)—see Queen Products Co Inc
ISO-PLANE—Motorola Communications & Electroni≫ Inc
ISO-Q—Isolantite Mfg Corp
ISO BESTOS—Natvar Corp
ISO GLAS—Natvar Corp
IVANHOE—Miller Co IVCO—Iona Ventilator Co Inc IVORY-X—Pass & Seymour In

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"J" LINE—Lint Clyde W
Jack & Heintz Int 17600 Broadway Cleveland 1
Ohio
JACK RABBIT—Hubbell (Harvey) Inc
JACKSON—Vulcan Electric Co
Jackson Electrical Instrument Co 18 S Patterson
Blvd Dayton 2 Ohio
Jackson Electrical Company 900 West Van Buren St
Chicago 7 Illinois

JAGABI—Biddie (James G) Co
JAQUET—Sticht (Herman H) Co Inc
JAVABOND—Javex
Javex P O Box 646 Redlands California
Jay Lighting Mfg Co Inc 23-29 Quincy St Brookiyn
Stylep—Mercury Manufacturing Co
Jefferson Electric Co 25th & Madison Bellwood III
Jeffrey Mfg Co Columbia 16 Ohio
Jeffries Transformer Co 610 Turner St Los Angeles
12 Calif
Jenkins Bros Rubber Div 100 Park Ave New York 17
NY
Jensen Inc 9331 Freeland Ave Detroit 28 Mich
Jensen Specialities—see Jensen Inc
Jerrold Electroics Corp 23rd & Chestnut Sts Phila
3 Pa
JET-EUGE—Millers Falls Co
JET FLUX—All-State Welding Alloys Co Inc
JET STREAM—Signal Electric Div King-Seeley Corp
JEWEL—Dependable-Elec Mfg Co Inc
JIFFY—Mineraliac Electric Co
Jo-Bell Products Inc 5456 W 111 St Oak Lawn III
JOB-STIE—International Trailer Co Inc
JOBMASTER—Ramset Fastening System
Johnson-Marwille 22 East 40th St New York 16 New
York
Johnson King Co Co—see Johnson Mfg Co Inc
Johnson Mfg Co Inc 600 Anamosa Rd Mt Vernon
Ilowa
Johnston Foil Mfg Co 6106 S Broadway St Louis
11 Mfg Co
JOINTED-ARM—Woodward Machine Co Lighting Div
JOMANCO—Johns-Manwille
Jones Motrola Corp 432 Fairfield Ave Stamford
Comm
Jordan Electric Products Div
Jordan Electric Products Div
Jordan Electrics Products Div
Jordan Electrics One-see Johnson Rd
Jordan Electric Products Div
Jordan Electric Products Div
Jordan Electric Storage Battery
Co Jordan Electric Products Div
Jordan Electric Storage Battery
Co Jordan Electric Products Div
Jordan Electrics Storage Battery
Co Jordan Electric Storage Battery
Co J

Joslyn Mfg & Supply Co 3700 S Morgan St Chicago 9 III

9 III
Joy Mfg Co Electrical Products Div 1201 Macklind
Ave St Louis 10 Mo
JUMBO PLATE—Sierra Electric Corp
JUMBODUCT—National Electric Products Corp
JUTE PLUG—Arro Expansion Bolt Co

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Kenbert-Arpag Co 520 Barretto St Bronx 59 NY Kendail Co-see Polyken Sales Div Kennecott Wire and Cable Co Phillipsdale (Rumford 16) RI (Rumford Company Inc 359 Canal St Rome New York Lighting Corp 500 Johnson Ave Brooklyn 37 NY Metal Mfg Co Inc—see Kent Lighting Corp
KENTLITE—Kent Lighting Corp
Kerworth Co Winsted 1 Kans
KEPS—Hilinois Tool Works Shakeproof Div
Kester Solder Company 4201 Wrightwood Ave Chicago 39 Illinois
Kett Appliance Co—see Kett Tool Co
Kett Tool Co 5056 Madison Rd Cincinnati 27 Ohio
Key-Hak Corp—see Producers and Distributors Inc
Key-Hak Products Co—see Producers and Distributors
Inc Key-Hak Corp—see Producers and Distributors Inc.
Key-Hak Products Co—see Producers and Distributors Inc.
Keyes-Davis Co 74-14th St Battle Creek Mich KEYNOTE—Edwards Co Inc.
KEYSTONE—Diamond Expansion Bolt Co Inc.
KEYSTONE—Dieston (Henry) Div.
KEYSTONE—Electric Service Manufacturing Company
KEYSTONE—Fullman Manufacturing Company
KEYSTONE—Fullman Manufacturing Co.
KEYSTONE—Fullman Manufacturing Co.
KEYSTONE—Fullman Manufacturing Co.
KEYSTONE—Bokonte Co.
KEYSTONE—Monte Co.
KEYSTONE—Mont Keystone Mfg Co 23328 Sherwood Rd Warren Mich Kichler (L D) Co 2101 Superior Ave Cleveland 14 Ohio Kidde (Walter) & Co Inc 459 Main St Belleville 9 NJ Kilbury Mfg Co Inc 14529 Hawthorne Blvd Lawndale Calif Killark Electric Mfg Co 3940 Easton Ave St Louis Killark Electric Mfg Co 3940 Easton Ave St Louis 13 Mo KILOTRON—Electric Arc Inc Kimble Glass Co P O Box 1035 Toledo 1 Ohio Kin Tel 5725 Kearney Villa Rd San Diego 12 Calif Kindorf Co—See Steel City Electric Co KING—Curits Lighting Inc KING—Partrick & Wilkins Co King Mfg Corp 3146 N Chicago Ave Chicago 22 III King Refrigerator Corp 76-02 Woodhaven Bivd Glendale 27 NY Kingston Conley Inc North Plainfield NJ Kingston Conley Inc Standard NJ Kingston Conley Inc Kingston Conley Inc Standard NJ Kingston Conley Inc King Eigh Illinois
Kinney Equipt Co-see Washington Kinney Co Inc
KIPP & ZOREN-Biddle (James G) Co
Kirel Inc Box 459-A RFD I Kingston
Kirk & Blum Mfg Co 3120 Forer St
Cincinnati 9 Ohio
KIRK KEY-1-T-E Circuit Breaker Co R & IE Equipment Div Kirkland (H R) Co 8 King S Morristown NJ

Kirkland (H R) Co 8 King S Morristown NJ
KIRKWOOD—Wisconsin Carbon Corp
Kirkwood Carbon Corp 4857 W 130 Cleveland 11
Ohio
Kirkwood Commutator Corp 4855 W 130 St Cleveland 12
Ind 1 Ohio
Kirlin Company 3435 East Jefferson Ave Detroit 7
Michigan
Kirlin Company 3435 East Jefferson Ave Detroit 7
Michigan
Kirlin Company 3435 East Jefferson Ave Detroit 7
Michigan
Kirlin Company 3435 East Jefferson Ave Detroit 7
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Kirlin Company 3435 East Jefferson Ave Detroit 7
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Kirlin Company 3435 East Jefferson Ave Detroit 7
Michigan
Kirlin Farab Company 3435 East Jefferson Ave Detroit Co
Kirlin Ciep Stewart Mfg Co Inc
Kielen Stell—Anderson Electric Corp
KLEEN VITU—Superior Insulating Tape Co
KLEEN-SEEL—Anderson Electric Corp
KLEEN LOW-Neo-Ray Products Inc
Kielin (Leo) Electronics 2404 S LaBrea Ave Los
Angeles 16 Calif
KLEIN-KORD—Klein (Mathias) & Sons
KLEIN-LINE—Klein (Mathias) & Sons
KLEIN-LOK—Klein (Mathias) & Sons
KLEIN-LOK—The Sons
KLEIN-LOK

Mo
3 Ohio
Kneisley Electric Co 2501-2509 Lagrange St Toledo
3 Ohio
KNI-TROM—Kneisley Electric Co
KNOCK-OUT—Lee (K 0) Co
KNOPP—Electrical Facilities Inc
Knopp Inc 1307 66th St Oakland 8 Calif
Knox Porcelain Corp 2706 Mynders Ave P 0 Box
2031 Knoxville 1 Tennessee
Koch (Paul W) & Co—see Lint (Clyde W)
Koch & Lowy Mfg Co 201 E 34 St New York 16
NY
KODAIRE—Sperti Faraday Inc
Koehler Manufacturing Co 395 Lincoln St Mariborough Massachusetts
Kohler Company Kohler
Koiled Kords Inc Box K Hamden Conn

Feries Lamo Div

borough Massachusetts
Kohler Company Kohler Wisconsin
Koiled Kords Inc Box K Hamden Conn
KOLD—Faries Lamp Div
Kolton Electric Mfg Co 123 New Jersey Railroad
Ave Newark 5 New Jersey
Kondu Corp 1040 W 12 St Erie Pa
Kondu Div Erie Malleable Iron Co—see Kondu Corp
KONKRETE KORE—Tilden Tool Mfg Co

KOOL-SEL—Pyramid Electric Co
KOOLER-AIRE—United States Air Conditioning Corp
Bidg Pittsburph 19 Pa
Kord Kleonard El Co P O Box 55424 Indianapolis
5 Ind
Kord Mfa Co Inc 4510 White Plains Rd New York
70 NY
KORDUCT—Johns-Marwille
KORKER—U S Expansion Bolt Co
KORNER KING—RCS TOOL Sales Corp
Korns (C C) Co P O Box 483 Johntown Pa
KOTE-LITE—Woodward Machine Co
Kraeuter & Co Inc 585 18th Ave Newark 3 New
Jersey
KRALASTIC—United States Rubber Co Naugatuck
Chemical Div
KRANE KAR—Silent Hoist & Crane Co
KRISP—Burpee Can Sealer Co
KROMOVER—Ail-State Welding Alloys Co Inc
Kruse-Rieke Auburn Ind
Kuhlman Electric Corp 633 S Fulton Ave Mount
Vernon Mich
Kulka Electric Corp 633 S Fulton Ave Mount
Vernon Mich
Kulka Electric Corp 633 S Fulton Ave Mount
Vernon Kirl
Kurz-Root Co Inc—see Kurz & Root Sales & Engineering Corp
Kwirk-Chalmad St Appleton Wis
KWIK-Chalmad St Appleton Wis
KWIK-Chanke—Leviton Manufacturing Co Inc
KWIK-Chalmad St Appleton Wis
KWIK-Chanke—Leviton Manufacturing Co Inc
KWIK-Chalmad St Appleton Wis
KWIK-Chanke—Leviton Manufacturing Co Inc
KWIK-Chanke—Leviton Manufacturing Co Inc
KWIK-Chanke—Froject Fixture Mfg Corp
KYLON—Mystik Adhesiber Products Inc
Kyova Fibre Pipe Co Ironton Ohio

L

L-BLOW—Trade-Wind Motorfans Inc
LK—General Air Conditioning Corp
LM—Line Material Industries
L & P—Light & Power Utilities Corp
L P I—Lighting Products Inc
LS-FLOOD—Radiant Lamp Corp
LAB-HEAT—Blue M Electric Co
Labelon Tape Co Inc 450 Atlantic Ave Rochester 9 NY
NY
LABSTROBE—Berkshire Laboratories
Laclede Steel Co Arcade Bidg St Louis 1 Missouri
LADDER LINE—Hilumitronic Engineering
Laduby Co Inc Boston Post Rd (P O Box B8) Brantford Conn
LADY PRICE—Burpse Can Sealer Co
Laganke Electric Co—see Lake Shore Electric Corp
LAKE—National Time & Signal Corp
Lake Erie Electric Mfg Inc 2952 W 22 St Erie Pa
Lake Mfg Co 2923 Chestnut St Oakland Calif
Lake Shore Electric Corp
Lake Shore Electric Corp Ohio
Lake Shore Electric Mfg Co—see Lake Shore Electric Cambo Shore Electric Mfg Co—see Lake Shore Electric Corp
LAKIN—Thomas & Betts Co
Laminated Plastics Inc—see Glastic Corp
LAMP KING—Maxwell Equipment Co Inc
LAMP KING—Maxwell Equipment Inc
LAMPE MARKER—Keys—Lancaster Ohio
Lancaster Lens Co—see Lancester Glass Corp
LANCE MARKER—Keys—Davis Co
Land—Air Inc 7444 W Wilson Ave Chicago 31 III
Lantz Mfg Co Inc Valparaiso Ind
Lapp Insulator Co Inc 35 Gilbert St Leroy NY
Larco Inc Route 20 East Painesville Ohio
LARKIN—Central Transformer Corp
Larkin Lectro Products Co—see Central Transformer
Corp
Larkin Lectro Products Co—see Central Transformer
Corp
Larkin Lectro Products Co—see Central Transformer
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Larkin Lectro Products Co—see Central Transformer
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Larkin Lectro Products Co—see Central Transformer
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Larkin Lectro Products Co—see Central Transformer
Corp
Larkin Lectro Products Co—see Central Transformer
Corp
Larkin Lectro Products Co—see Central Transformer
Corp Corp
LaRGASE (W T) & Associates Inc 31 Ontario St
Cohoes NY
LARRA—Cursis Lighting Inc
Larson Instrument Co 24 Orchard St Tarrytown NY
LASAIR Products Inc—see Markel Electric Products Inc
LAST WORD—Starrett (L S) Company
Lastik Products Co Inc 201 Iroquois Bidg Pittsburgh
13 Pa
LATROBE—Fullman Manufacturing Co
LAUBROMAT—Westinghouse Elec Corp Appliance Div
LAUBL—Industrial Development Labs Inc
LAUBROMAT—Westinghouse Elec Corp Appliance Div
LAVOLAIN—Star Porcelain Co
LAY-CIT—Kearney (James R) Corp
LAY-IN—Square D Co
LAY-CIT—Kearney (James R) Corp
LAY-IN—Square D Co
LAY-EX—Kaiser Aluminum & Chemical Sales Inc
LE CARBOME—Carbone Corp
Leader Lamp Mfg Co 476 Broome St NY 13 NY
LEAF-LITE LUMINUS—Luminous Ceilings Inc
LEC-TROL-FEED—Delta-Star Electric Div H K Porter Co Inc
LECTRO-VAC—Leckie Electric Utensil Co Inc
Lectron Inc 5560 Northwest Highway Chicago 30
III LEDLEX—Leland (G H) Inc LEDLOX—U S Expansion Boit Co Lee (K O) Co Congress at First Ave S E Aberdeen S Dak Lee (Walter) Chemical Corp 1383 Seabury Ave Bronx 61 NY 61 NY
Lee Electric Inc 566 52 St West New York NJ
Leebaw Mfg Co 65 Wayne Ave Youngstown 2 Ohio
Leeds & Northrup Co 4970 Stenton Ave Phila 44 Pa
LEEFLUOR—Lee (Walter) Chemical Corp
LEESONA—Universal Winding Co
Leetonia Tool Co 182 Main St Leetonia Ohio
Leibrired (C H) Mfg Corp 95-101 Guernsey St Brooklyn 22 W
Leitch Engineering Corp Commercial at Stark St
Manchester NH
LEKOLITE—Certury Lighting Inc
Leland Electric Co 1501 Webster St Dayton 1 Ohio
Leland (G H) Inc 123 Webster St Dayton 2 Ohio
Lelno CAMpaper Mfg Co Inc
Lenk Mfg Co Franklin Ky
LENOX—Day-Brite Lighting Inc
LENSDRUM—Art Metal Co
LENSLITES—Corning Glass Works
LeTourneau (R G) Inc 2399 S MacArthur
Tex
LEV-O-LET—Leviton Manufacturing Co Inc
LEV-O-LITE—Leviton Mfg Co Inc LEEFLUOR-Lee (Walter) Chemical Corp LEV-O-LET—Leviton Manufacturing Co Inc
LEV-O-LITE—Leviton Mfg Co Inc
LEV-O-LOCK—Leviton Manufacturing Co Inc
LEVEL MASTER—Jo-Bell Products Inc
Leviton Manufacturing Co Inc 236 Greenpoint Ave
Brooklyn 22 New York
LEVOLIER—McGill Manufacturing Co Inc
Lev Electric Fittings Co 627 W Lake St
Chicago 6
Levis Empineering Co 52 Rubber Ave
Conn
Leves Electric Co 1254 W Harrison St Chicago 7
III III
LEXINGTON—Miller Co
Liberty Bell Mfg Co Inc Swainsboro Ga
Licon Switch & Control Div Illinois Tool Works 2501
N Keeler Ave Chicago 99 III
Lidseen (Gustave) Inc—see Lidseen of North Carolina Lidseen of North Carolina Inc 1000 First St Hayes-Lidseen of North Carolina Inc. 1000 First St. Mayeswille NC.
LIFE GUARD—Dorsey (John E) Co.
LIFE-LINE—Westinghouse Electric Corp.
LIFE-LUBE—Westinghouse Electric Corp.
LIFE-TIME—Billings & Spencer Co.
LIFE TIME—Billings & Spencer Co.
LIFE TIME—Slater Electric & Mfg. Co. Inc.
Lifetime-Industrials—see Lighting Products Inc.
LIFETIME LIGHTING—Dynaseal Lighting Corp.
LIFT STACKER—Allied Mfg & Sales Co.
LIFT STACKER—Allied Mfg & Sales Co.
LIFE TIME LIGHTING—TOPALED LIGHTING—TOPALE Lift Trucks Inc 2425 Spring Grove Ave Cincinnati 14
Ohio
LIFTRUK—Silent Hoist & Crane Co
LIGHT-IN-LINE—Moe-Bridges Corp
Light & Power Utilities Corp 1035 Firestone Blvd
Memphis 7 Tennessee
LIGHT WARDEN—Electric Cord Co
LIGHT WARDEN—Electric Cord Co
LIGHT WARDEN—Electric Cord Co
LIGHT WARDEN—Electric Products Inc
LIGHTGUARD—Exide Industrial Div Electric Storage
Battery Co
Lighting Dynamics Inc 802 W Whittier Blvd
WhitLighting Dynamics Inc 802 W Whittier Blvd
Lighting Dynamics Inc 1549 Park Ave West
HighLighting Dynamics Inc 1549 Park Ave West Battery Co
Battery Co LINCOLM—Forsion Delectric Co LINCOLM—Sangamo Electric Company Lincoln Electric Co 22801 St Clair Ave Cleveland 17 Ohio 17 Ohio
LINCOLNDUCTOR—Lincoln Electric Co LINCULNUUCTOR—Lincoln Electric Co
LINCONTROL—Sangamo Electric Co
LINCOLNWELDER—Lincoln Electric Co
LINCWELDER—Lincoln Electric Co
Lindberg Engineering Co 2450 W Hubbard St Chicago
12 111 Lindberg Engineering Co 2450 W Hubbard St Chicago 12 III
Linde Air Products—see Union Carbide Corp
Lindell Electric Control Corp 384 Canal St New
York 13 NY
LINEA-MATIC—Stromberg Time Corp
LINEA-SPEDE—Allis (Louis) Co
LINEA-SPEDE—Allis (Louis) Co
LINEA-SPEDE—Allis (Louis) Co
LINEA-SPEDE—Allis (Louis) Co
LINEA-RO—Flectric Controller & Mfg Co
LINE GUARD—Preformed Line Products Co
LINE KING—Skyworker Div
LINE Material Co—see Line Material Industries McGraw-Edison Co
Michigan St Milwaukee Wis
LINEO-HAET—Smith-Gates Corp
LINEO-HAMPS—Wiremold Co
LINEO-HAMPS—Wiremold Co
LINEC-O-LAMPS—Wiremold Co
LINEC-O-LAMPS—Wiremold Co
LINEC-O-LAMPS—Wiremold Co
LINEC-O-METER—Simpson Electric Co
LINEC-O-METER—Simpson Electric Co

LINESTARTER—Westinghouse Electric Corp
Lintern Corp—see Larco Inc
LINULITE—Frink Corp
Lint (Clyde W) 2323 W 18 St Chicago 8 III
LION—Southco Div South Chester Corp
LIP SPOT—Mid-States Welder Mfg Co
LIQUATITE—Electri-Fiex Co
LIQUID-ICE—Cool-ette Inc
LIQUID TITE—Electrical Fittings Corp
LITE BLOX—Guth (Edwin F) Co
LITE COMB—McPhilben Mfg Co Inc
LITE-LINER—House-O-Lite Corp
LITE-LONE—House-O-Lite Corp
LITE—Stocker & Yale Inc
LITE—North—Homin Caster & Mfg Co
Litecontrol Corp 36 Pleasant St Watertown 72
Massachusetts
Litecraft Mfg Corp 100 Dayton Ave Passaic New
Jersey Litecraft Mfg Corp 100 Dayton Ave Passaic New Jersey
LITEKRAFT—Cole (C W) & Co Inc
LITEMASTER—Art Specialty Co
LITEMASTER—Flexo International Corp
LITEMASTER—Globe Lighting Products Inc
LITE-UR-WAY—Edoc International Corp
Lithonia Lighting Products Co Box 206 Conyers Ga
Littelfuse Inc 1865 Miner St Des Plaines Illinois
LITTLE CHAMP—Champion DeArment Tool Co
LITTLE DEVIL—Ohmite Manufacturing Co
LITTLE GEM—Equipto Div Aurora Equipment Co
LITTLE WAJOR—Arro Expansion Bolt Co
LITTLE WIZARD—ROUND (David) & Son Inc
Littleford Bros Inc 453 E Pearl St Cinclnnati 2
Ohio LITTLE WIZARD—Round (David) & Son Inc
LITTLE WIZARD—Round (David) & Son Inc
Littleford Bros Inc 453 E Pearl St Cincinnati 2
Ohio
LIVELYAIRE—Westinghouse Electric Corp
LLOVD—Johnson Manufacturing Co Inc
LO-HRITE—Holophane Company Inc
LO-HED—American Engineering Co
LO-LOSS—National Electric Products Corp
LO-NOIX-LEVEL—Allen Cooler & Ventilator Inc
LO-VOLT—Industrial Devices Inc
LO-VOLT—Industrial Devices Inc
LO-VOLT—Industrial Devices Inc
LO-AD SINTRY—Assembly Products Inc
LOAD—LISTRY—Assembly Products Inc
LOAD—LISTRY—Assembly Products Inc
LOAD SINTRY—Assembly Products Inc
LOACK-ITTE—American Pulsey Co
LOCK-ITTE—Thomas & Betts Co
LOCK-ITTE—American Seelants Co
LOCK-ITTE—American Seelants Co
LOCK-ITTE—Holophane Company Inc
LOCK-IND—Holophane Company Inc
LOCK-IND—Holophane Company Inc
LOCK-IND—Holophane Company Inc
LOCK-IND—Holophane Company Inc
LOK-INT—United Divisions Electric Corp
LOK-ITT—Gub Regineers
LOK-ITTE—United Divisions Electric Corp
LOK-ITTE—Holophane Electric Corp
LOK-ITTE—United Divisions Electric Corp
LOK-ITTE—United Divisions Electric Corp
LOK-ITTE—United Divisions Electric Corp
LOK-ITTE—Holophane Electric Corp
LOW-ERLINEER—Electric Electric Corp
LOW-ERLINEER—Electric Electric Corp
LOW-ERLINEER—Electric Electric Corp
LOW-ERLINEER—Elec Lowell Insulated Wire Corp P O Box 260 Pawtucket
RI
Lowell Insulated Wire Corp P O Box 260 Pawtucket
Lowell Insulated Wire Corp
LOXARMOR—Okonite Co
LOXIN—Star Expansion
LOXON—McGill Mfg Co Inc
LUARA—Curdis Lighting Inc
LUB-O-JET—Trico Fus Mfg Co
LUB-O-JET—Trico Fus Mfg Co
LUCETTE—Versen (Kurt) Company
LuCIGE Furnaces Inc Nashaminy Pa
LUCO—Lukens (Thomas F) Metal Co
Ludiow Mfg & Sales Co P O Box 101 Needham
Heights 94 Mass
Lug-All Co—see Handy Angle Div Lug-All Co
Ludens (Thos. F) Metal Co Ludens (Thos. F) Metal Co
Lukens (Thos. F) Metal Co Hedley & Bath Sts Philadelphia 37 Phetal Co Hedley & Bath Sts Philadelphia 17 Phetal Co
Luma Electric Equipment Co 1607 Colning Drive
(P O Box 132) Toledo Ohlo
LUMARROL—Micro Balancling Inc
LUMI-PRIO—Silviray Lighting Inc
LUMI-PRIO—Silviray Lighting Inc
LUMI-TONE—Pollak Luminescent Corp
LUMI-TONE—Pollak Lighting Inc
LUMI-TONE—Pollak Luminescent Corp
LUMI-TONE—Pollak Luminescent Corp
LUMI-TONE—Pollak Luminescent Corp
LUMI-TONE—Pollak Lighting Inc
LUMI-TONE—Pollak Luminescent Corp
LUMI-TONE—Pollak Luminesce Luminous Ceilings Inc 2500 W North Av 47 III
LUMIRAMA—Litecraft Mfg Corp
LUMIPEX—Litecraft Mfg Corp
LUMO—Appleton Electric Co
LUNAR—Versen (Kurt) Co
LUNOTY—Specialties Inc
LUNGEN—Edwards Co Inc
LUSTERIZED—American Electric Cable Co
LUSTERIAC—American Electric Cable Co
LUSTERIAC—American Products Inc

LUVE TILE—Wilson (J A) Lighting & Display Inc
LUVEX—Day-Brite Lighting Inc
LUVEX—Day-Brite Lighting Inc
LUVER-LUMINUS—Luminous Ceilings Inc
LUX-GRILL—House-O-Lite Corp
LUXARE—Pfaff & Kendall
Luxor Lighting Products Inc 350 5th Ave New York
1 NY
LUXTROL—Superior Electric Co
LUXWOOD—Moe Light Div
Lynbrook Gas and Electric Stoves—see Associated Stove
LYNN—Vaco Products Co
Lyon Rural Electric Co 2075 Moore St San Diego
12 California
LYTECASTER—Lightolier Inc
LYTELINE—Lightolier Inc
LYTESAR—Lightolier Inc
LYTESPAN—Lightolier Inc

M

Co MAGNA WELDER—Auto Arc-Weld Mfg Co MAGNACAP.—Lew Electric Fittings Co MAGNACHARGER.—Fox Products Co MAGNADUR—Ferroxcube Corp of America MAGNADUR—Ferroxcube Corp of America MAGNADURE—Westinghouse Electric Corp Lighting MAGNALAIRE—Westinghouse Electric Co
Div
MAGNAPULSE—Gemco Electric Co
MAGNATORC—Hansen Mfg Co Inc
MAGNATORC—Hansen Mfg Co Inc
Magnatra Inc P O Box 211 Kearny NJ
MAGNATROL—Century Lighting Inc
Magnatrol Valve Corp 67 Fifth Ave Hawthorne New
Jersey
Magnavox Co 2131 Beuter Rd Fort Wayne 4 Ind
MAGNEBRAKE—Vickers Inc
MAGNECLUTCH—Vickers Inc
MAGNECLUTCH—Vickers Inc
MAGNEFILE—Electronics Corp of America
Magnethermic Corp P O Box N Youngstown 7 Ohio
Magnethermic Export and Development Corp—see Magnethermic Corp magnetnermic Export and Development Corp—see Mag-nethermic Corp MAGNETREATER—Radio Frequency Laboratories Inc MAGNETREATER—Zinsco Electrical Products Magnetrol Inc 2110 South Marshall Blvd Chicago 23 Illinois magnetrol inc 2110 South Marshall Blvd Chicago 23
Illinois
MAGNETTE—Heinemann Electric Co
Magni Flood Inc 50 Crary Ave Nit Vermon NY
MAGNI-WHIRL—Blue M Electric Co
MAGNI-WHIRL—Crane (HW) Co
Majestic Metal S & S Co Inc 537 Sackett St
Brooklyn 17 NY
MAJOR—Gem Electric Mfg Co Inc
Major Equipment Co 4603 W Fullerton Ave Chicago
MAL-LEAD—Arro Expansion Bolt Co
MALLEAD—Arro Expansion Bolt Co
MALLEAD Mright Tool Co
MALLEAD Tool Co 305 S Gray St Indianapolis
6 Ind
MALLSAW—Mail Tool Co 6 Ind
MALLSAW—Mail Tool Co
MAMMOTH—Neo-Ray Products Inc
MANCHEX—Exide Industrial Div
Battery Co
MANCRID—Driver (Wilbur B) Co
MANHATTAW—Raybestos-Manhattan Inc
Manning (RA) Co Inc 1810 North Ave Sheboygan Wis Manning (RA) Associates—see Manning (RA) Co Inc Manning Maxwell & Moore Inc Shaw-Box Crane & Hoist Div Muskegon Mich MANSON—Okonite Co
MANULUX—Major Equipment Co Inc
MANULUX—Major Equipment Co Inc
MARATHON—Marathon Electric Mfg Corp
Marathon Battery Co P O Box 298 Wausau Wis
Marathon Electric Mfg Corp Wausau Wisconsin
MARATHON Electric Mfg Corp Wausau
MARBELITE—Pacific Union Metal Co

Marbelite Co Inc. 179 N 10 St. Brooklyn 11 NY MARCO-Marvin Mfg Co Marco Industries 207 S Helena St Anahelm Calif MARGLO-Marvin Electric Mfg Co Marcus Transformer Co Inc Lesville Ave Rahway NJ Marion Electrical Instrument Co Grenier Field Manster NH (Clayton) & Co 1900 Dempster St Evanston ARK-TIME—Rhodes Inc M H
ARKARRIER—Chisholm-Ryder Co Inc Premax Products Div MARK-TIME-Markel Electric Products Inc 145 Seneca St Buffalo 3 NY
3 NY
Market Forge—see American Pulley Co
Market Forge—see American Pulley Co
Chicago 22 Illinois MARKSMAN—West Instrument Corp
Markstone Mfg Co 1531 N Kingsbury Chicago 22 III
Mariin-Rockwell Corp 402 Chandler St Jamestown
MY LO—Sperti Faraday Inc
Mariou Lights Inc Fanwood NJ
Marquette Electric Switchboard Co 311 N Desplaines
St Chicago 6 III
MARR—Rattan Mfg Co III Marsh (Jas P) Corp 3501 Howard St Skokie III Marsh Heating Equipment Co—see Marsh (Jas P) Corp Marsh Instrument Co—see Marsh Corp James P Marsh Refrigeration Equipment Co—see Marsh (Jas P) Corp arshall (John) Associates Inc Box 2463 Bridgeport Marshall (John) Associates Inc Box 2463 Bridgeport 8 Conn
Martin Fan & Blower Co 4634 West 21st Place Chicago 50 Illinois
Martin (H P) & Sons 801 W 12 St P 0 Box 475 Owensbore Ky
Martindale Electric Co 1383 Hird Ave Cleveland 7 MARTLITE-Ainsworth Lighting Inc MARVEL—Pollak (Joseph) Corp MARVEL—Pullman Vacuum Cleaner Corp MARVEL—United Electric Motor Co Marvel Fluorescent Mfg Co—see Marvel Lamp Co Marvel Lamp Company 307 Newark St Hoboken NJ Marvel Rack Mfg Co Inc 24 N First St Minneapolis Marvel Rack Mfg Co Inc 24 N First St Minneapolis
1 Minn
Marvin Electric Mfg Co 648 Santa Fe Ave Los
Angeles 21 Calif
Marvin Mfg Co—see Marvin Electric Mfg Co
MASCO—Simpson (Mark) Mfg Co Inc
MASCO—Simpson (Mark) Mfg Co Inc
MASCO—Simpson (Mark) Mfg Co Inc
MASCO —Simpson (Mark) Mfg Co Inc
Mason (L E) Co 98 Business St (Hyde Park)
Boston 36 Mass
Massey (A H) Inc 111 3rd St (P O Box 206)
Derby Conn
Massey-Ferguson Industrial Div
Massey-Ferguson Inc
1009 S West St Wichita 13 N Kans
MASTER—Benajmin Electric Mfg Co
MASTER—Asiasr Alumnium & Chemical Sales Inc
Master Electric Co—see Master Electric Div Reliance
Electric & Engineering Co
Master Electric Div Reliance Electric & Engineering
Co 126 Davis Ave Dayton 1 Ohio
MASTER-LIGHT—Carpenter Manufacturing Co
MASTER-REO—Cincinnant Time Recorder Co
MASTERBEAM—Miro Flector Co Inc
MASTERBEGAMG—Miro Flector Co Inc
MASTERBEAM—Miro Flector Co Inc
MASTERBEGAMG—Miro Flector Co Inc
MASTERBEG Mastercraft Plastics Co Inc 95-01 150th St Jamaica 35 NV
MASTERGAUGE Marsh (Jas P) Corp
MASTERGHUE—Blonder-Tongue Laboratories Inc
Masterlike Mfg Co 2758 Kensington Ave Phila Pa
MASTERPHONE—Kellogg Switchhoard & Supply Co
MATCHED UNITS—Universal Motor Co IV
MATCHED UNITS—Universal Motor Co IV
MCKInnon Chain Corp
Mathhews Div W N—see Chance Co (A B)
Matol Corp—see Eagle Mfg Co Inc
Matthews Electric Heater Mfg Co Albertville Ala
MAX-FLD—Shaw-Perkins
Maxwell Equipment Co—see Skyworker Div Emhart
Mfg Co MAX-FLU—Snaw-Forms
Maxwell Equipment Co—see Skyworker Div Emhart
Mfg Co
Mayhew H H—See Mayhew Steel Products Inc
Mayhew Steel Products Inc Sears St Extension Shelburne Fails Massachusetts
Maymer Corp 1961 W 112 St Cleveland 2 Ohio
MAZZELLA—Wire Rope Corp of America Inc
McCafe-Powers Rody Co 5900 N Broadway St
Louis 15 Mo
McCaffrey Mfg & Supply Co 1840 W 14 St Chicago
B 111 8 111
McCARTHY—Salem Tool Co
McCarthy Electric Co 9640 Grinnell Detroit 13 Mich
McColpin-Christie Corp—see Christie Electric Corp
McCorkie (D H) Co Box 97 Station A Berkeley Calif McDonald Mfg Co—see Sierra Electric Corp
McDonnell & Miller Inc 3500 N Spalding Ave Chicago 18 111 McFarland (L D) Co McFarland Bldg Sandpoint McGill Manufacturing Co Inc Valparaiso Indiana McKee Div Thatcher Glass Mfg Co Inc Jeannette Pa McKee Glass Co—see McKee Div Thatcher Glass Mfg Co Inc McKinley (Ben P) Co 522 S Clinton St Chicago 7 McKiniey-Mockenhaupt Co—see McKiniey (Ben P) Co MC LAREN—Brush Aboe Inc McLarty Systems 2600 Dickman Rd Battle Creek Mich

McLean Engineering Laboratories 70 Washington Rd (P O Box 228) Princeton NJ McPhilben Mfg Co Inc 1329 Willoughby Ave Brooking 37 My Mechanical Industries Production Co 217-223 Ash St Akron 8 Ohio Mechanical Products Inc 1824 River St Jackson Michigan AKTOR 5 Union
Mechanical Products Inc 1824 River St Jackson
Michigan
Meco Metal Box & Panel Mfg Co Inc 2522 W Huntingdon St Phila 32 Pa
MEDALIST—Marion Electrical Instrument Co
MEGGER—Biddle (James G) Co
MEGGHM TEST—Davenopt Mfg Co
MEGOHM TEST—Davenopt Mfg Co
Meier Electric & Machine Co Inc 3525 East Washington St Indianapolis 7 Indiana
Meier-johan-Wengler 1102 West Ninth St Cincinnati
3 Ohio
MELETRON—Barksdale Valves
MELL-CARY—Eagle Electric Mfg Co Inc
MELOCALL—Edwards Company Inc
MELOPAL—Edwards Company Inc
MELOTAL—Edwards Company Inc
MELOTOR—Magnetic Engineering & Mfg Co
Memco Engineering & Mfg Co Mend-It Sleeve Mrg to 3125 diorn relate calif

Mephisto Tool Co Inc Box 16 Hudson New York

MERCHANT—Miller Co

MERCO-Orona Mrg Corp

MERCO LITE—Great Northern Mrg Corp

MERCO LITE—Great Northern Mrg Corp

MERCO LITE—Great Northern Mrg Corp

MERCOLLY 401 W Belmont Ave Chicago 41 III

MERCONTROL—Mercold Corp

MERCU-LITE—Kenworth Co

Managem—Vulcan Electric Co Mercury Vulcan Electric Co
Mercury Hydraulics Inc 1632 Wazee St Denver 2 Colo
Mercury Mfg Co 4700 W Division St Chicago III
MERCURYSTAT—Westinghouse Electric Corp
Merwin Manufacturing Co 19th & German Sts Erie Merwin Manufacturing Co 19th & German Sts Erie Pennsylvania Metal & Thermit Corp Rahway NJ METAL ZIPPER—Mid-States Welder Mfg Co METALBRAID—Hitemy Wires Inc Metalcraft Products Co Inc Mascher & Lippincott Sts Philadelphia 33 Pennsylvania Metalectrics Inc 677 Broadway N Y 12 NY METALEX—Willard Storage Battery Co METARAY—Wiegand (Edwin L) Co Metal Communication of the Communication of t New York METER-MATIC—International Register Co METER-MATIC—Leitch Engineering Corp Meters Inc 5353 North Keystone Ave Indianapolis 20 METL-CAN-Pyramid Electric Co Metro Casting Co Inc 47 Gratum St Brooklyn 37 Metron Instrument Co 432 Lincoln St Denver 3 Meyer Machine Inc Red Wing Minn MIAMI CAREY—Carey (Philip) Mfg Co Mica Fabricating Co 53 Central Ave Rochelle Park NJ NJ
MICA-GLAS—National Electric Coil Co
MICA MAT—Seneral Electric Co
MICA MAT—General Electric Co
MICALTER—Induction Heating Corp
MICALTER—Westinghouse Electric Corp
MICARTA—Westinghouse Electric Corp
Michigan Florescent Light Div 393 Orchard Lake Ave
Pontiac Mich Michigan Oven Co 415 Brainard Detroit 1 Mich
Michigan Intrument Co 80 Trowbridge St Cambridge 38 Mass MicReLAY—Ebert Electronics Corp MicRo—Frestrind-Aire Div Corp Corp Micro Balancing Inc 191 Herricks Rd Garden City Pk NY Micro Div Minneapolis-Honeywell Regulator Co—see Micro Switch
MICRO LITE—Burton Mfg Co
MICRO-MANIC—Micro Balancing Inc
MICRO POWER—United States Motors Corp MICRO-NAMIC—Micro Balancing Inc
MICRO POWER—United States Motors Corp
Micro Switch Corp—see Micro Switch Div of Minneapolis-Honeywell Regulator Co
Micro Switch Div of Minneapolis-Honeywell Regulator Co
Switch Div of Minneapolis-Honeywell Regulator Co
Micro Switch Div of Minneapolis-Honeywell Regulator
Co Chicago & Spring Freeport III
MICROFILASH—General Radio Company
MICROFICASH—General Radio Company
MICROFICASH—General Radio Company
MICROFICASH—General Radio Company
MICROFICASH—Manning Maxwell & Moore Inc
MICROSEN—Manning Maxwell & Moore Inc
MICROSEN—Manning Maxwell & Moore Inc
MICROFITH—Simpson Electric Co
MID-GETTURY—Mitchell Mig Co
MID-GETTURY—Mitchell Mig Co
MID-JET—Electro Devices Co Inc
MID-RIP—General Cable Corp
Mid-States Welder Mig Co 6025 South Ashland Ave
Chicago 36 Illinois
Mid-West Chandeller Co 15th & Gentry (P O Box
7365) North Kansas City 16 Mo
MIDGET—Swivelier Co Inc
Midget Heater & Specialty Co 2801 Pacific Ave
Tacoma 4 Wash
MIDGETALK—Simpson (Mark) Mig Co Inc
MIDGETESTER—Simpson Electric Co

Midland Paint & Varnish Co 3801 E 91st St Cleve-land 5 Ohio Midland Wire Corp—see Paranite Wire & Cable Div MIDLENE—Paranite Wire & Cable Div MIDPRENE—Paranite Wire & Cable Div Essex Wire Corp MIDWAY—Simpson (Mark) Mfg Co Inc Midwest Electric Mfg Co 1639 Walnut St Chicago 12 Illinois Midwest Electric Products Inc 1515 North Front Midwest Electric Products Inc 1515 North Front Mankato Minnesota Mindwest Lighting Products Co P 0 Box 536 Edgewater Branch Cleveland 7 Ohio MIGHTY MIDGET—Coffing Hoist Div Duff-Norton Co MIGHTY MIDGET—Stanley Electric Tools MIGHTY MITE—Mexhanical Industries Production Co MIGHTY-MITE—Remington Arms Co Inc MIGHTY-MITE—Remington Arms Co Inc MILCARB—Wrought Washer Mfg Co MILL-CARB—Wrought Washer Mfg Co MILL-O-MATIC—Luxor Lighting Products Inc MILL-BORD—Carey (Philip) Mfg Co MILL-O-CON MILL-O-C Miller (Sanford) Co 691 Bedford Ave Brooklya 6 Miller Electric Mfg Co 718 S Bounds St Appleton Wis Miller Equipment Co Inc 13th & New Sts Franklin Miller Harris Instrument Co 601 E Ogden Ave Milwaukee 2 Wis Miller-Robinson Co 7007 Avalon Blvd Los Angeles 3 Calif Millerbernd Mfg Co Winsted Minn MILLITE—Westinghous Electric Corp Lighting Div Miles System Devices—see United States Petroleu GO MILWAUKEE—Northern Light Company Milwaukee Electric Tool Corp 5368 W State St Milwaukee 8 Wis Milwaukee Parts Corp 607-15 S Sixth St Milwaukee 4 Wis Wis Milwaukee 4 Wis

MILWAUKEE WROT—Wrought Washer Mfg Co

MIN-A-CLIPS—Mineraliae Electric Co

MINALITE—Westinghouse Electric Corp Lamp Div

MINALITH—Koppers Co Inc Wood Preserving Div

MINALITH—Koppers Co Inc Wood Preserving Div

Mine Safety Appliances Co 201 N Braddock Ave

Pittsburgh 8 Pa

Mineraliae Electric Co 25 North Peoria St Chicago 7

Illinois MINI-MARKER—Westline Products Div MINI-PLATE—Javex MINI RELAY—Ebert Electronics Corp MINI-SOCKET—Javex MINI-VOLT—Industrial Devices Inc MINICOUBE—Fullerton Mfg Co MINIGATOR—Mueller Electric Co MINIGATOR—Mueller Electric Corp MINIGATOR—Mueller Electric Corp
Minnreapolis Electric & Construction Co 80 South 12th
St Minneapolis Minnesota
Min MiroFlector Co Inc 40 Bayview Ave Inwood LI NY NY
NRO-HAT—MiroFlector Co Inc
MIROLITE—MiroFlector Co Inc
MIROLITE—MiroFlector Co Inc
MIROLITE—See Aluminum Goods
MIROSCOPE—Simpson Electric Co
MIROSCOPE—Si NY Miskella Infra-Red Co East 73rd & Grand Ave Cleveland 4 Ohio
MISSING LINK-Mid-States Welder Manufacturing Company
Mission-Western Engineers Inc—see Western Gear Corp
Mitchell Industries Inc Box 17 Municipal Airport
Mineral Wells Tex
Mintchell Lighting Co 1800 N Spaulding Ave Chicago Mitchell Mfg Co 3200 W Peterson Ave Chicago 45 Mitchell Mfg Co Lighting Div—see Mitchell Lighting Mitchell Moulding Co 1501 Circle Ave Forest Park Mitchell Moulding OS 11 Murray St NY 7 NY MITCO—Mitchell Moulding Co MITEE—International Electric Fence Co Inc MITI-MAST—Utility Service Co Inc MIXALI—Barber-Greene Co MOBILE BREEZE—Frigid Inc Most Mast Inchange Electric Corp MOBILAIRE—Westinghouse Electric Corp Mobile Aerial Towers Inc 1730 N Harrison St Fort Wayne Ind MOBILEX—Day-Brite Lighting Inc

MOCO-Michigan Oven Co Modern Electric Laboratory—see Blue M Electronic enn DERNPHONE-Radio Corp of America Engineering Products Div MODU-AIRE—United States Air Conditioning Corpora-MODU-AIRE—United States Air Conditioning Corporation
MODU GLO—Marvin Electric Mfg Co
MODU-LUMINUS—Luminous Cellings Inc
MODU-LAR—Couch (S H) Co Inc
MODULE—Mitchell Manufacturing Co
MODULE—Major Equipment Co Inc
MODULE—Major Equipment Co Inc
MODULE—Major Equipment Co Inc
MOELIFE—Major Equipment Co Inc
MoELight Div Thomas Industries Inc 410 S 3rd
St. Louisville Ky
MOEAAPTES—Moe Light Div
MOHAWK—Frigid Inc
MOHAWK—Surette Storage Battery Co Inc
MOISTURE MAGNET—Remington Corp
Remington Air
Conditioning Div MOISTURE MASNET—Remington Corp Remington Air Conditioning Div Mon. DOCHILL—Capewell Mfg Co Mois-Richardson Company 937 North Sycamore Ave Hollywood 38 California Moily Corp 230 North Fifth St. Reading Pa Moloney Electric Co 5390 Bircher Blvd St. Louis 20 Missouri Missouri
MON-O-LAG-Monarch Electric Corp
Mona Industries Inc Paterson 17 NJ
Mona Southern—see Mona Industries Inc
MONAMINE-Mona Industries Inc
MONAMCH—Clark-Cooper Co Inc 317 N Market St
Palmyra N Palmyra NJ MONARCH—Curtls Lighting Inc Monarch Electric Corp 118 E First St Jamestown Monarch Fuse Co Ltd—see Monarch Electric Corp Monarch Lighting Fixture Corp—see Ender-M Corp MonaSTRIP—Mona Industries Inc
MONELITE—Dockson Corp
Monitor Controller Co 99 Grove St Rockland Massa-Monitor Controller Co 99 Grove St Rockland Massachaetts:
MONO-BOLT—Chance (A B) Co
MONO-LAG—Monarch Fuse Co Ltd
MONO-LAG—Monarch Fuse Co Ltd
MONOGRAM—Retrigerating Specialties Co
MONOGRAM—Retrigerating Specialties Co
MONOMAST—Hyster Co
MONOMAST—Hyster Co
MONOMAST—Hyster Co
MONOTUBE—Union Metal Manufacturing Co
MONOWATT—General Electric Co
MONOWATT—General Electric Co
MONOWELD—All-State Welding Alloys Co Inc
MONSON SLATE—Portland-Monson Slate Co
Montgomery & Co Inc 7 Tichenor Lane Newark 2
NJ Moon Mfg Co 108 N Jefferson St Chicago 6 Illinois
MOORE—Chisholm-Moore Hoist Div Columbus McKinnon Chain Corp
MORELITE—Rambusch Decorating Co
Morrison Steel Products Inc 601 Amherst St Buffalo 7 NV Norvow Co 400 West Madison St. Chicago 6 Illinois Morse (Frank W) Co 1300 Soldiers Field Rd Boston 35 Mass Morse (Frank W) Co 1300 Soldiers Field No Souton 35 Mass
Morse Chain Co Borg Warner Corp Ithaca NY Mossman (Donald P) Inc Breester NY MOT-0-TROL—Westinghouse Electric Corp MOT0-LIFE—Safeway Steel Products Inc Moto Products Manufacturing Co—see American Generator & Armature Co Moto-Truc Co 1753 E 59 St Cleveland 3 Ohlo MOT0PRENE—Paranite Wire & Cable Div Essex Wire Corp MOTOPRENE—Paranite Wire & Cable Div Essex Wire Corp
MOTOR SENTINEL—Bryant Electric Corp
MOTOR SENTINEL—Bryant Electric Corp
MOTOR WATCHMAN—Westinghouse Electric Corp
MOTOR WATCHMAN—Westinghouse Electric Corp
MOTOR-Droducts Co-see Graham (Phillip E) Co Inc
MOTORDOR—Broan Manufacturing Co Inc
MOTOREDUERSS—Faik Corp
Notionescarch Company 1600 Junction Ave Racine
Wisconsin Wisconsin MOTORLARM—Panellit Inc MOTORLITE—Ward Leonard Electric Co
MOTORLYTICS—Micamold Radio Corp
Motorola Communications & Electronics Inc 4501
Augusta Blvd Chicago 5 III
MOTORTRON—Bussman Mfg Div
MOTORTROL—Automatic Control Co
MOVAL—Missourf Betling Co
Mueller Climatrol 2005 W Oklahoma Ave Milwaukee 1 Wis Mueller Electric Co 1555G E 31 St Cleveland 14 Ohio Mueller (I. G) Furnace Co—see Mueller Climatrol MuelLERAIRE—Mueller Climatrol Mulenbach Div Electric Machinery Mfg Co 2300 E 27 St. Los Angeles 58 Calif Mullenbach Div Electric Machinery Mfg Co—see Mullenbach Div Electric Machinery Mfg Co—see Mullenbach Div Electric Machinery Mfg Co—see Mullenbach Div Almsworth Mfg Corp 1471-77 E Atwater St. Detroit 7 Mich MultaLARM—Automatic Control Co MultaLARM—Automatic Control Co MultaLARM—Automatic Control NultaLARM—Automatic Control NultaLARM—Automatic Control NultaLARM—Automatic Control NultaLARM—Frought Inc 2277 Ford Parkway St Paul 16 Minn Multal-Com—Radio Corp of America Multal-Com—Radio Corp of America Multal-Com—Radio Corp of America Multal-Com—Radio Corp of America Multal-Com—Radio Corp of Electric Mfg Co

Multi Electric Mfg Inc 4223-43 West Lake St Chicago 24 Illinois Multi-Mount—Blackburn (Jasper) Carp Multi-Mount—Sterling Electric Motors Inc Multi-Mount—Sterling Electric Motors Inc Multi-Mount—Sterling Electric Motors Inc Multi-Mount—Sterling Electric Motors Inc Multi-Mount—Sterling Electric Multi-Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—Mount—

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NE-National Electric Products Corp NE—National Electric Products Corp
N.J.—New Jersey Porcelain Co
N.L Corp 2480 E 22 St Cleveland 15 Ohio
NTC—Keystone Carbon Co
NWL—Notherfer Winding Labs
NAIL IT—Thiel Tool & Engineering Co
NALCO—National Lead Company
NALCO—North American Electric Lamp Co
NAMCO—National Acme Company
Nankervis (Geo L) Co 15300 Fullerton Ave Detroit
27 Milch Nankervis user 27 Mich
27 Mich
NARADRECT—Narragansett Wire Co
NARAWIRE—Narragansett Wire Co
NARAWIRE—Wire Co
NARAWIRE—Starragansett Wire Co
Narragansett Wire Co
541 Pawtucket Ave Paw-Narragansett Wire Go 541 Pawtucket Ave Pawtucket RI
Natale Machine & Tool Co 339 Highway 17 Caristadt
NJ
Natco Corp 327 Fifth Ave Pittsburgh 22 Pa
NATIONAL—General Hardware Mfg Co Inc.
National Acroe Co Electrical Mfg Div 170 E 131
St Cleveland 8 Ohio
National Band & Tag Co 721 York St Newport Ky
National Carbon Co 535 Fifth Ave New York 17 NY nal Cathode Corp 5 University PI New York 13 National Cathode Corp 5 University Priew York 15 NY
National Decaicomania Corp 236-38-40 N 60 St
Phills 39 Pa
National Electric Coil Co 800 King Ave Columbus
16 Ohle
National Electric Controller Co 7070 Glenwood Ave
Chicago 26 III
National Electric Products Corp Gateway Center 140
Stamwik St Pittsburgh 22 Pa
National Electric Welding Machines Co 1846-1961
N Trumbull St Bay City Mich
National Jerrold Systems Inc—see Jerrold Electronics
Corp NATIONAL-LAKE—National Time & Signal Corp National Lend Company 111 Broadway New York 6 NATIONAL-LAKE—Mational Time & Signal Corp.
National Load Company 111 Broadway New York 6
New York
National Pole & Treating Co—see National Pole &
Treating Div Minnesota & Ontario Paper Co
National Pole Treating Div Minnesota & Ontario
Paper Co 500 Investors Bidg Minneapolis 2 Minn
National Poultry Band Co—see National Band & Tag Co
National Price Service—see Henderson Hazel Corp
National Specialties Co Inc 1902 Howell St Fort
Wayne 7 Indiana
National Super Service Co 1946 N 13 St Toledo
Ohio Ohio
National Time & Signal Corp 21800 Wyoming Ave
Detroit 37 Michigan
National Varnished Products Corp—see Natwar Corp
NATSCO—National Time & Signal Corp
Natvar Corp 211 Randolf Ave Woodbridge New Ohip Jersey
Naybor (E V) Laboratories Inc 26 Manorhaven Blvd
Port Washington NY
NE-0-LITE—Speedex Mig Co
NEASESTUS—National Electric Products Corp
NEATPAK—Federated Metals Div American Smelting
& Refining Co
NEBROC—Hittemp Wires Inc
Neco Tool & Engineering Co—see Neco Mfg Co Inc
NELEX—Nelson Electric Mfg Co
Nelson Electric M Wash
NEMCO FLOOD—Nemco Electric Co
NEMCRAFT—Nemco Electric Co
NEO-LO—La Salle Products Inc

NEO-GLO—Markel Electric Products Inc NEO-GRIP—Star Expansion Neo-Ray Products Inc 315 East 22nd St New York 10 New York NJ Jersey Porcelain Co Inc Plum St & N Y Ave P O Box 908 Trenton 5 NJ New Jersey Zinc Co 160 Front St New York Revolving Portable Elevator Co—see Revolvator Co—see Revolvator Co—see Revolvator Co—see Revolvator Co—see Rev volvator Co
NEW YORKEM—Sun-Lite Mfg Co
Newage Industries Inc 222 York Rd Jenkintown Pa
Newage International Inc—see Newage Industries Inc
Newart Mfg Co 6825 Machinery Ave Cleveland Ohio
Newcomb Audio Products Co 6824 Lexington Ave
Hollywood 38 Calif
Newman Electric Motors Inc 357 Wilson Ave Newark 5 NJ
NEWVAR—Penetone Co
NIAGARA—Erie Electric Co Inc
NIAGARA—Erie Electric Co Inc
NIAGARITE—Johns-Mamville
Nicad Div Gould-National Batteries Inc Easthampton NIANTIE—Johns-Manville
Nicad Div Gould-National Batteries Inc Easthampton
Mass
Nice Ball Bearing Co 30th & Hunting Park Ave
Philadelphia 40 Pennsylvania
Nickel-Cadmium Battery Corp—see Nicad Div
NIGHTINGALE—Adjustable Fixture Co
Nikoh Tube Co 5000 S Whipple St Chicago 32 III
NISTAIN—Driver (Wilbur B) Co
9000 ARC —Mid-States Welder Mfg Co
NITE-BEAM—Eagle Electric Mfg Co Inc
NITELBR—Fisher-Pierce Co Inc
NO-FARK—Co-operative Utilities Co Inc
NO-FARK—Co-operative Utilities Co Inc
NO-FARK—Co-operative Utilities Co Inc
NO-SHOK—Bell Electric Company
NOARK—Federal Electric Products Co
NOBARON—Sorensen & Co Inc
NOBSHOM—Sorensen & Co Inc
NOBSEAL—Johns-Manville
Noel Mfg Co 3 W 18 St New York 11 NY
NOKORODE—Dunton (M W) Co
NORD—Dunton (M W) Co
NORD—Dunton (M W) Co
NORD—Dunton (M W) Co
NORCA—Ajax Electrothermic Corp
NORCONTE—Ajax Electrothermic Corp NORCONTE—Ajax Electrothermic Corp
NORGAN—Ajax Electrothermic Corp
NORGAN—Ajax Electrothermic Gorp
NORJAX—Ajax Electrothermic Gorp
NORJAX—Ajax Electrothermic Gorp
NORJAX—Ajax Electrothermic Gorp
NORJAG—Northern Light Co
NORMAG—Ajax Electrothermic Corp
NORMOLITH—Ajax Electrothermic Corp
NORSAND—Ajax Electrothermic Corp
NORSAND—Ajax Electrothermic Corp
NORSAND—Northwoods Mfg Chemists Inc
North American Electric Lamp Co 1546 N 13th St
St Louis Mo
NORTH-LITE—Great Northern Manufacturing Corp
NORSTH-LITE—Great Northern Manufacturing Corp
NORTHERN-AIRE—Great Northern Mfg Corp Northern Blower Co 6434 Barberton Ave Cleveland 2 Ohio Northern Incandescent Lamp Co 1 Newark St Northern Incandescent Lamp Co 1 Newark St Hoboken NJ Northern Light Company 1661 North Water St Milwauke 2 Wisconsin NoRTHERN LIGHTS—Northern Incandescent Lamp Co Northwoods Mfg Chemists Inc Porterfield Wis NORTHRUP—Ajax Electrothermic Corp NORTHWIND—Emerson Electric Mfg Co NORVIT—Ajax Electrothermic Corp NORVIT—Ajax Electrothermic Corp Nothelfer Winding Labs Inc 5 Albermarle Ave (P O Box 455) Trenton 3 NJ Novelty Lighting Corp—see NL Corp NOVOID—G & W Electric Specialty Co NU-AIR—Meier Electric & Machine Co Inc NU-BRAZE—American Silver Co Inc Industrial Div NU-CUT—Snap-on Tools Corp

Nu Process Products Laboratories—see Specialty Mfrs
& Distributors

A Distributors

NU-WAY—Marshall (John) Associates Inc

NUBEL—Edwards Co Inc

NUBEL—Edwards Co Inc

NUBEL—Edwards Co Inc

NUCUT—Heller Brothers Co

NUCUT—Heller Brothers Co

NULTIE—Dependable-Elec Mfg Co Inc

Nu-Tone Inc Madison & Red Bank Rds Cincinnati 27

Ohio

Nutting Truck and Caster Co 1201 W Division St

Faribault Minn

NUWAY—Jordan Electric Products Div

age Battery Co

Nye Tool Co 4120-30 Fullerton Ave Chicago 32 III

NYLAFLOW—Polymer Corp of Pa

NYLASINT—Polymer Corp of Pa

NYLASINT—Polymer Corp of Pa

NYLAWELD—Polymer Corp of Pa

NYLAWELD—Rardman (H V) Co Inc

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O-B— Ohio Brass Co
OCCO—Tocco Div Ohio Crankshaft Co
O-E—Arrow Expansion Bolt Co
OEM—Oliver Electrical Mfg Co
OK—Appleton Rubber Co Inc
OK—General Cable Corp
O-K—Henderson Electric Co
O-PAC—Opad Electric Co
O-S.—American Not. & Bolt Fastener Co
OTC—Owatonna Tool Co
O-Z—Zernickow (O) Company
O.Z. Electrical Mfg Co Inc 262 Bond St Brooklyn 17
NY O-Z-Zernickow (O) Company
OX. Electrical Mfg Co Inc 262 Bond St Brooklyn 17
OX. Company
OX. Electrical Mfg Co Inc 262 Bond St Brooklyn 17
OXMCO—Overbagh & Ayres Mfg Co
OBELCOR.—O'Brien Electric Corp
O'Brien Electric Corp 6514 Santa Monica Blvd HolIywood 38 Calif
OBRUND.—Crouse-Hinds Co
OBSERVER.—Blonder-Tongue Laboratories Inc
OCT-0-DUCT.—Saapstone Duct Co
OCTA-TUBE.—Millerbernd Manufacturing Co
OCTA-TUBE.—Millerbernd Manufacturing Co
OCULITE.—Burton Mfg Co
ODOR.MASTER.—Edoo International Corp
ODOR.OUT.—Westinghouse Electric Corp
ODOR.OUT.—Westinghouse Electric Corp
OHIO.—Round Bridgeport Chain & Mfg Co
OHIO.—Round Bridgeport Chain & Mfg Co
OHIO.—Round Bridgeport Chain & Mfg Co
OHIO.—Now Manin St Mansfield Ohio
Ohio Carbon Co
OHIOHM—Ohio Carbon Co
OHIOHM—Ohio Carbon Co
OHMIDHM—Ohio Carbon Co
OHMIDHM—Ohio Carbon Co
OHMSTONE.—Johns.Manville
OIL TITE—Westinghouse Electric Corp
OILIFTER.—Ootnois Co
OKO CORD.—Okonite Co
OKOLINE—Okonite Co
OKOLINE—Okonite Co
OKOLINE—Okonite Co
OKOTHERM.—Okonite Co
OKOSEAL—Okonite Co
OKOTHERM.—Okonite Co
OKOTHERM.— Oliver Electrical Mfg Co P O Box 217 Battle Creek Mich Oliver Iron & Steel Corp—see Oliver Electrical Mfg Co OLOF—Thompson (O) Inc Oliver Iron & Steel Corp—see Oliver Electrical Mfg Co
OLOF—Thompson (O) Inc
UVMPIA—Beniamin Electric Mfg Co
OLVMPIC—Lint (Clyde W)
OLYMPIC—Sun-Lite Mfg Co
OLYMPIC—Sun-Lite Mfg Co
Olympic Instrument Laboratories Vashon Wash
Omark Industries Inc 9701 S E McLoughlin Bivd
Portland 22 Ore
OMEGA—Wakefield Co
OMEGA-RAY—Luxor Lighting Products Inc
OMAI-GLOW—Industrial Devices Inc
OMAI-GLOW—Industrial O'Neil-Irwin my
Minn
ONLI—Perfeclite Co
Opad Electric Co 69 Murray St New York 7 NY
Opad-Green Co—see Opad Electric Co
OPALITE—Lightolier Inc
OPALITE—Opad-Green DuKane Corp Operadio Mfg Co—see DuKane Corp OPTIPLEX—Lightolier Inc OPTO-MATIC—Trico Fuse Mfg Co OPTO-MATIC—Trico Fuse Mfg Co
Orangeburg Manufacturing Co Inc Orangeburg NY
ORBLITE—Steber Mfg Co
ORGANO-FLUX—London Chemical Co Inc
ORGOBLOS—Spencer Turbine Co
ORTHO—Gibson Mfg Co
ORTHO—Line Material Industries McGraw-Edison Co ORTO—Line Material Industries McGraw-Edison Co Oster Mfg Co 1340 E 289 St. Wickliffe Ohio OVALDUCT—National Electric Products Corp OVALIT—Kliegi Bros OVALITE—Line Material Industries OVALTUBE—Plastoid Corp Overbagh & Ayres Mfg Co 411 South Clinton St. Chi-cage 7 Illinois Overly-Hautz Co 11500 Madison Ave. Cleveland 2 Ohio

Ovlatt (D C) Co 2174 Lakeside Ave Cleveland 14 Ohio
Owatonna Tool Co 374 N Cedar St Owatonna Minn
Owents-Illinois Glass Co Kimble Glass Co Div—see
Kimble Glass Co
Oxford Electric Corp Hudson Lamp Co Div—see Hudson

Lamp Co
OXOFF—Anaconda Wire & Cable Co
Oxwall Tool Co Ltd 928 Broadway New York 10 OZITE—G & W Electric Specialty Co OZONE-LITE—New York Fluorescent Mfg Co

PAD Inc—see Producers and Distributors, Inc
P-A:X—Automatic Electric Co
P & B—Potter & Brumfield Inc
PD-X—Phelps Dodge Copper Products Corp
P & K—Pfaff & Kendall
PLM P-Potducts Inc 3871 W 150 St Cleveland 11 PLM Products Inc 3671 W 150 St Cleveland 11
Ohlo
PMD—Columbia Technical Corp
P-N—Pyle-National Co
P.Q.—Pekcu Company
PR—Plymouth Rubber Co Inc
P. & R—Potter & Rayfield Inc
P&S—Pass & Seymour Inc
PTC—Precision Transformer Corp
PVC—Royal Electric Corp
P&W—Partick & Wilkins Co
P-W Industries Inc Duncan & Melrose Sts Phila 24-Pa P-W Industries Inc Duncan & Meirose Sts Phila 24-Pa
PWC—Plastic Wire & Cable Corp
PACE MAKER—Hubbell (Harvey) Inc
PACEMAKER—Hubbell (Harvey) Inc
PACEMAKER—Wakefield Co
PACIFIC Tearnsformer Co Inc—see Western Pacific Electric Co
Pacific Tearnsformer Co Inc—see Western Pacific Transformer Co Inc
PACIFIX—Wesix Electric Heater Co
PACIFIX—Wesix Electric Heater Co
PACKAGE-AIRE—United States Air Conditioning Corp
Package Electric Div General Motors Corp Warren
Ohio Ohio
PAGEPHONE—Femco Inc
Paine Company Fullerton Ave & Westgate Rd Addison
Illinois
PAGIT—American Pulley Co
PAL—Palnut Company
Paley Mfg Corp—see Circle Air Industries
Palmer Electric & Mfg Co 24 Water St Wakefield
Mass
PAMCO—Paraplegics Manufacturing Co Inc
PANL-HEAT—Jensen Specialties Inc
Panalarm Div Panelit Inc 7401 N Hamilin Ave
Skokle III
Panslarm Products Inc—see Panalarm Div
PANCAKE—Wiremold Company
PANCE—Using Products Inc
PANELIGRAPH—Panellit Inc
PANELIGRAPH—Panellit Inc
PANELIGRAPH—Panellit Inc
PANELUS COPE—Waterman Products Co Inc
PANELUS—Lighting Products Inc
Panellyt Inc 7401 Hamilin Skokie III
PANELSCOPE—Waterman Products Co Inc
PANELUS—Lighting Products Inc
Panellyte Div St Regis Paper Co 261 Madison Ave
New York 16 NY
PANG—Automatic Vulcanizers Corp
PAPOOSE—Canoewell Mfg Co
PAR-BEAM-LITE—Swiveller Co Inc
PAR-HERM—Paranite Wire & Cable Div
PARACOTE—Paranite Wire PAGEPHONE—Femco Inc
Paine Company Fullerton Ave & Westgate Rd Addison NY
Parker Electrical Mfg Co 221 Washington St. Oakland
7 California
Parr Electric Co-see Parr Mfg Corp
Parr Mfg Corp 44 Austin St. Newark 2 NJ
Partlow Corp 2 Campion Rd New Hartford NY
Partrick Carter & Wilkins Co-see Partrick & Wilkins
Co-see Partrick & Wilkins Co
Partrick & Wilkins Co 51 N Seventh St Phila 6 Pa
Pass & Seymour Inc Syracuse 9 New York
PASSMOUR—Pass & Seymour Inc
PATENT-FLEX—Wil-Son Mfg Co
Patent Scaffolding Co Inc 38-21 12th St LIC 1 NY
PATH OF LIGHT—Touch-Plate Mfg Corp
PATHFINDER—Cannon Electric Co
PATTERN-LITE—Keystone Electric Mfg Co

Pattern Products Co P O Box 135 Union NJ
PATTERNLITE—Associated Lighting Service
PAYMASTER—Cincinnati Time Recorder Co
Peck Stow & Wilcox Co 274 Center St Southington
Conn Conn
Peco-McClintock—see Protection Equoment Co Inc
Pedrick Tool & Machine Co 3640 N Lawrence St
Phila 40 Peper Control & Machine Co
PEE-WEE—Mueller Electric Co
PEERLESS—Delta-Star Electric Div H K Porter Co PEDRIMATIC—Pedrick Tool & Machine Co
PEE-WEE—Mueller Electric Co
PEER-Less—Belta-Star Electric Div H K Porter Co
PEER-Buseller Electric Div H K Porter Co
PEER-Buseller Electric Div H K Porter Co
PEER-SSO—Belta-Star Electric Div H K
Peter Int 1220 Miltion St Benton Harbor Mich
PEERLESS—Electric Service Manufacturing Company
PEERLESS—Electric Service Manufacturing Company
PEERLESS—Electric Co 1401 West Market St Warren
Dereits Mig Co—see Valley Fan Mig Co
PEERLESS—Plastic Wire & Cable Corp
Peerless Mig Co—see Valley Fan Mig Co
PEERLESS—Deneral Cable Corp
PEERLITE—Guth (Edwin F) Company
PEGI—Adalet Mig Co
PEERLES SD—General Cable Corp
PEERLITE—Guth (Edwin F) Company
PEGI—Adalet Mig Co
PEERLES SD—Hisdelphia Electric & Mig Co
PEER CO—Print County Company
PEDDOME—Versen (Kurt) Company
PENDOME—Versen (Kurt) Comp ment Co
PERFALUX—Lightolier Inc
Perfecillac D 1457 E 40 St Cleveland 3 Ohio
Perfecilline Mfg Corp Old Country Rd & Railroad
Ave P 0 Box 65 Hicksville LI NY
PERFECTAIRE—Perfect-line Mfg Corp
Perfection Stone Co-see Perfection Industries Div
Perfect Centrals—see General Controls CoPERM-ALIGN—Cummins Portable Tool Div John Oster Perfection Stone Co—see Perfection Industries Div Perfex Controls—see General Controls Co PERM-ALIGH—Cummin Portable Tool Div John Oster Mrg Co PERM-ACHASCER—Jordan Electric Products Div PERMA-CALS—Topflight Tape Co PERMA-CHARGER—Jordan Electric Products Div PERMA-CDDE—Brady (W H) Co PERMA-DURE—Phelos Dodge Copper Products Corp Permacel-Lepages Inc U S Highway #1 New Brunswick NJ Permacel Tape Corp—see Permacel-Lepages Inc PERMALINE—Line Material Industries rermanente Products Communication & Electronics Inc PERMALINE—Line Material Industries rermanente Products Co—see Kalser Aluminum & Chemical Sales Inc PERMAPREN—Sanborn Co PERMAPREN—Sanborn Co PERMAPRENE—Hatfield Wire and Cable Div Continental Copper and Steel Industries Inc PERMAPON—Chapman Chemical Co PERMI-CAL—Topflight Corp PHANO-CHARGER—General Electric Co PHASCARO—Chronoffash Co. PHASCARO—Chronoffash Co. PHELOS—CHAPCARO—Chronoffash Co. PHELOS—CHAPCARO—Chronoffash Co. PHELOS—PHILISE CORP PHILIAE ELectrical & Milgox Co PHILIAE Rock Ark Phelips Manufacturing Co—see Phelps Fan Milg Co PHILIAE Rock Ark Phelips Manufacturing Co—see Phelps Fan Milg Co PHILIAE CEAR—Philiadelphia Gear Works Inc PHILIAE CEAR—Philiadelphia Gear Works Inc Phillips Coscar Co 9701 Reseding Rd (Rev. 211) Philliz 21 Pa
PHILITE—Ruby-Philite Corp
PHILLIE—Ruby-Philite Corp
PHILLIE GEAR—Philadelphia Gear Works Inc
Phillips (Oscar) Co 9701 Reading Rd (Box 21)
Cincinnati 15 Ohio
Phillips Control Corp 59 W Washington St Jollet TH PHILPLUG—New England Carbide Tool Co Inc PHOENIX—Commercialaire Corp of America PHOENIX—Frigid Inc PHONACALL—Sperti Faraday Inc PHOSTUBE—All-State Welding Alloys Co Inc

PHOTO-TROLLER—Westinghouse Electric Corp
Photobell Co Inc. 43 Vesey St. New York 7
PHOTOGARD—Industrial Development Labs Inc
PHOTOX—Westinghouse Electric Corp
PHOTRONIC—Westing Instruments
PICK-OFF—Topflight Corp
Pierce Renewable Fuses Inc Box F Leicester NY
PIERCEWAY—Massey (A H) Inc
PIGMY—Capewell Mfg Co
Pines Engineering Co Inc 601 Walnut St. Aurora III
PIOLITE—Wilson (J A) Lighting & Display Inc
PION-GRIP—Star Expansion
PIONEER—Clark-Cooper Co Inc
Pioneer Electrical Mfrs—see Cutler-Hammer Inc
Piope Coupling Mfrs-Inc P 0 Box 488 Martins Ferry
Ohio Ohio PIPEMASTER—Erie Tool Works
PIPE MASTER—Oster Mfg Co
Piqua Machine & Mfg Co 441 S College St Piqua UNIO
PIRAC—Electri-Cord Manufacturing Co Inc
PISTOL-GRIP—Anderson Electric Corp
Pittonam Mfg Co 300 W 79 Terrace Kansas City 14
Md
Mf
DITT—Thepitt Mfg Co
Pittsburgh Reflector Co Oliver Bidg Pittsburgh 22
Pittsburgh Standard Conduit Co 61 Bridge St Pittsburgh 23
Pittsburgh Standard Conduit Co 61 Bridge St Pittsburgh 25
Pittsburgh Standard Conduit Co 61 Bridge St Pittsburgh 29
PLANFA—Automatic Control Co
PLANETOR—Price & Rutzebeck
PLANTE—Gould-National Batteries Inc
PLASTIC—Price & Rutzebeck
PLANTE—Gould-National Batteries Inc
PLASTIC-EC Company 2560 Noblestown Rd Pittsburgh 3
PLASTI-FIEX—Authurn Mfg Co
PLASTI-GRIP—AMP Inc
PLASTI-CRIP—AMP Inc
PLASTICAL—C & D Batteries Inc
PLASTICI-LINER—Duro-Test Corp
PLASTICOLE—C & D Batteries Inc
PLASTICINER—Ouro-Test Corp
PLASTICOLE—Chester Cable Corp
PLASTICOLE—Chester Ohio
PIRAC—Electri-Cord Manufacturing Co Inc
PISTOL-GRIP—Anderson Electric Corp
Pitman Mfg Co 300 W 79 Terrace Kansas City 14 POLE STAR—Pennsylvania Iransformer Dir McGraw-Edison Co Poles Inc East 706 Sprague Ave Spokane 3 Wash POLICARB—Driver (Wilbur B) Co Polls Mg Co 2906-20 W 26 St Chicago 23 III Pollak (Joseph) Corp 81-95 Freeport St Boston 22 Mass
Mass
Pollak Luminescent Corp 732 South Federal St Chlcago 5 Illinois
POLY-PLATE—Brady (W H) Co POLY-PLATE—Brady (W H) Co
POLY-ROPE—Industrial Products Co
POLY-U—Raybestos-Manhattan Inc
Polyken Sales Div Kendali Co 309 W Jackson Blvd
Chicapo 6 III
Polymer Corp 2120 Fairmont Ave Reading Pa
Polymer Corp of Pa—see Polymer Corp
POLYPANGE—Sensitive Research Instrument Corp
Porcelain Products Inc 224 N Patterson St Carey Ohio
PORT-A-PHONE—Feiler Engineering & Mfg Co
PORT-A-PONY—Thread-Ezy Mfg Co
PORT-A-PONY—Thread-Ezy Mfg Co
PORT-O-REEL—Industrial Electric Works
PORT-O-REEL—Industrial Electric Works
PORT-O-VENT—Reed Unit-Fans Inc
PORTA-BAND—Porter-Cable Machine Co
PORTA-EX—Gardner Products Co
PORTA-EX—Gardner Products Co
PORTA-FLEX—Gardner Products Co
PORTA-INC — Copy Engineering Corp
PORTALITE—Carpenter Manufacturing Co
PORTALTE—Carpenter Manufacturing Co
Porter-Cable Machine Co 700 Marcellus St Syracuse
4 NY
Porter Metal Products Inc—see Kent Metal Mfg Co
Inc Portland-Monson Slate Co 465 Congress St Portland Portland-Monson Slate Co 465 Congress St Portland 3 Maine
PORTO—Messel (W F) Co Inc
PORTO—MITE—Beaver Pipe Tools Inc
PORTO PAC—Electric Are Sales Co P 0 Box 587
Vpsilanti Mich
PORTO-POWER—Blackhawk Mfg Co
PORTO-SHEARS—Black & Decker Mfg Co
PORTO-SHEARS—Black & Decker Mfg Co
POSTFOET—S & C Electric Company
POSITIVE SEAL—Allis-Chalmers Mfg Co

Post Machinery Co Electronic Products Div 140
Elliott St Beverly Mass
POST-LITE—Great Northern Manufacturing Corp
POSTUP—Holophane Co Inc
Potter & Brumfield Inc Princeton Indiana
Potter & Rayfield Inc P 0 Box 1042 Atlanta Ga
POWR-GARD—Anderson (Albert & JM) Mfg Co
POWACALL—Edwards Co Inc
Powder Power Tool Co—see Omark Industries Inc
POWDIRON—Bound Brook Oil-Less Bearing Co
POWER GODSTER—McGolpin-Christie Corp
POWER GAPSULE—Bogue Electric Mfg Co
POWER CHARGER—For Products Co
POWER CHIEF—Nordberg Mfg Co
POWER-LUME—Wheeler Reflector Co
POWER-STREAK—American Electric Cable Co
POWER-STREAK—American Electric Cable Co
POWER-STREAK—American Electric Corp
Appliance Div
POWERSEL—Auth Electric Company Inc POWERAIRE—Westinghouse Electric Corp Appliance Div POWERAIRE—Auth Electric Company Inc Powercraft Corp 2215 DeKaib St. St. Louis 4 Mo POWERDEL—Auth Electric Cable Co POWEREL—Industrial Electrical Works POWERLOID—Guardian Electric Mfg Co POWERLOID—Guardian Electric Mfg Co POWERLOID—Guardian Electric Mfg Co POWERLOID—Guardian Electric Co POWERPACT—Sperti Farraday Inc. POWERLOID—MCABC-Powers Body Co POWERS-AMERICAN—McCabc-Powers BODY CO POWERS BODY POWERS-AMERICAN—McCabe-Powers Body Co
POWERSTAT—Mercoid Corp
POWERSTAT—Superior Electric Co
POWR-PAK—Winpower Mfg Co
POWR-PAK—Winpower Mfg Co
POWR-RIB—Ohmite Manufacturing Co
POXALLOY—Okun (A L) Co Inc
PRAYEE LIGHT—Aeroid Lights Corp
Pre-Fab Heater Co—see Chromalox Inc
PRE-INSULATED—AMP Inc
PRE-MARX—Chisholm-Ryder Co Inc Premax Products
Div Div
PRECIPITRON—Westinghouse Elec Corp Sturtevant Div
PRECISION-CHARGE—Lincoln Electric Co PRECISION-CHARGE—Lincoln Electric Co
Precision Thermometer & Instrument Co 1434 Brandywine St Philadelphia 30 Pa
Precision Transformer Corp 2218 West Lake St Chicago 12 III
Precision Welder Mfg Co 2218 W Lake St Chicago
12 III
Preco Inc Electra Motors Inc Div—see Electra Motors Inc.

REENX—General Electric Co
PREENX—General Electric Co
Preformed Line Products Co 5349, St Clair Ave
Cleveland 3 Ohio
Premax Products Div Chisholm-Ryder Co Inc College
& Highland Aves Niagara Falls NY
Prentiss Wabers Products Co—see Preway Inc
Prepo Corp Edgerton Wis
PRES-SURE—Buchanan Electrical Products Corp
PRES-TO-HEAT—Triton Mfg Co Inc
Prescolite Mfg Corp 2229 Fourth St Berkeley 10
Calif PRES-TO-HEAT—Triton Mfg Co Inc
Prescolite Mfg Corp 2229 Fourth St Berkeley 10
Calif
PRESIDENT—Simpson (Mark) Mfg Co Inc
PRESIDENTAL—Pittsburgh Reflectro Co
PRESS LITES—Sun-Lite Mfg Co
PRESSTALTER—Automatic Steam Products Corp
Pressteel Co—see Prescolite Mfg Co
PRESSTOMAC—Buck Mfg Co
PRESSTOMAC—Buck Mfg Co
PRESSTOMORT—Buck Mfg Co
PRESSTAL—Tal Bender Inc
PRESTESTAL—Tal Bender Inc
PRESTESTAL—Tal Bender Inc
PRESTEST—Cutler-Hammer Inc
PRESTEST—Cutler-Hammer Inc
PRESTEST—Cutler-Hammer Inc
PRESTEST—Cutler-Hammer Inc
Press J Inc 4301 W Madison Chicago Ill
Price Electric Corp East Church & Second Sts
Frederick Mf
Price & Retuzebeck P O Box 30 Hayward Calif
PRINCESS—Curtis Lighting Inc
PRINCO—Precision Thermometer & Instrument Co
Pringle Electrical Mfg Co 1900-1912 N Sixth St
Philadelphia 22 Pa
PRISMALUME—Holophane Co Inc
PROSTENT—Guth (Edwin F) Co
PRODUCERLITE—Solar Light Mfg Co
Producers and Distributors Inc 1321 Hanover Ave
Allentown Pa
PRODUCTIMETER—Durant Manufacturing Co
Production Planning Co—see Allen Cooler & Ventilator
Inc
PROGRAMONITOR—Counter & Content Com-Progress Mfg Co Inc Castor Ave & Tulip St Phila 34
Pa
Project Fixture Mfg Co 55 Ongley St Rockville
Centre NY
PROJECTORAMA—Century Lighting Inc
PROMAL—Link-Belt Co
PROMATIC—General Control Co
PROPELLAIR—Robbins & Myers Inc
PROTECTO—Modern Industrial Products Co
PROTECTO—Modern Industrial Products Co
PROTECTO—MASK—Mystik Adhesive Products Inc
PROTECTO—Modern Industrial Products Inc
PROTECTO—Link—Chance (A B) Co
PROTECTO—Lautomatic Control Co
PROTEX—Daniel Woodhead Co
PROTEX—Delta—Star Electric Div
PROTEX—Electric Service Manufacturing Co
PROTECT—Electric Service Manufacturing Co
PROTECT—Electric Service Manufacturing Co
Pryne & Co Inc—see Emerson-Pryne Co
Pucel Enterprises Inc 3746 Kelley Ave Cleveland 14
Onio Ohio PUL-LIFT-Yale & Towne Mfg Co

PULFEX—Universal Metal Hose Co
PULPUZSWITCH—Adam (Frank) Electric Co
PULIL-REEL—Narragansett Wire Co
Pullman Vacuum Cleaner Corp 25 Buick St
Boston
15 Mass
PULSARC—Westinghouse Electric Corp
PULSESCOPE—Waterman Products Co Inc
PULSCOPE—Waterman Products Co Inc
PULSCOPE—Waterman Products Co Inc
PULSEATOR—Given Mfg Co
PUMPTOL—Selectric Lighting Inc
PUMPTOL—Square D Co
PUMPTOL—Square D Co
PUNCHY—Curtis Lighting Inc
PUPRI-IR-LITE—House—O-Lite Corp
PUR-IR-LITE—House—O-Lite Corp
Pure Carbon Co Inc
PURELUBE—Pure Oil Co
PURELUBE—Pure Oil Co
PUROLENE—Pure Oil Co
PUROLENE—Pure Oil Co
PUSH BUTTON—White-Rodgers Co
PUSH BUTTON—Whi Pyramid Instrument Corp 630 Merrick Rd Lynbro
NY
PYRANOL—General Electric Co
PYRATHERM—Mercold Corp
PYREX—Corning Glass Works
PYRO—Pyrometer Instrument Co
PYROCON—Illinois Testing Laboratories Inc
PYROCON—Illinois Testing Laboratories Inc
PYROLANCE—Illinois Testing Laboratories Inc
PYROMEC—Illinois Testing Laboratories Inc
PYROTANCE—Illinois Testing Laboratories Inc
PYROTAC—Illinois Testing Laboratories Inc
PYROTROLLER—Illinois Testing Laboratories Inc
PYROTROLLER—Illinois Testing Laboratories Inc
PYROTROLLER—Illinois Testing Laboratories Inc
PYROTTE—Westinghouse Electric Corp
PYROVENT—Bertam (Harvey P) Co

Q-BESTON—Auburn Mfg Co
Q P BREAKER—Adam (Frank) Electric Co
Q P BREAKER—Adam (Frank) Electric Co
QIKLUG—Bundy Corp
QUAD—Quadrangle Mfg Co
Quadrangle Mfg Co
Quadrangle Mfg Co
Quadrangle Mfg Co
Quadrangle Mfg Co
QUAKER—Lukens (Thos F) Metal Co
QUAKER—Lukens (Thos F) Metal Co
QUAKER—Buder (Thos F) Metal Co
QUAKER—Buder (Thos F) Metal Co
Quality Tools—County Electric Mfg Co
Quality Tools—County Electric Mfg Co
Quality Tools—County County (Thos Corp
Quality Tools—County County (Thos County)
QUALAR—Quaker City Electric Mfg Co
Quality Tools—County County (Thos County)
QUALAR—Pyle-National Co
Quick Charge Inc 10th & Missouri Sts Oklahomms
City 17 Okla
QUICK-CLEAN—Allis-Chalmers Manufacturing Co
QUICK AET—Quick Charge Inc
QUICK STEAM—Quick Charge Inc
QUICK STEAM—Quick Charge Inc
QUICK STEAM—Quick Charge Inc
QUICK AET—County (Thos Charge Inc
QUICK AET—County (Thos County)
QUICK Charge—County (Thos County)
QUICK (Thos County)
Q Quijada Tool Div Gaines-Collins Co—see Collichinery Corp
QUIK-LABEL—Brady (W H) Co
QWIK-LOK—Eagle Electric Mfg Co Inc
QUIK-PLATE—Brady (W H) Co
QUIK-VAC—Clements Mfg Co
QUIK-VAC—Clements Mfg Co
QUIKSITE—H-B Instrument Co
QUIKSITE—H-B Instrument Co
QUINCSITE—H-B Instrument Co
QUINCY Mfg Co
QUINCY Elevator Gate Co—see Quincy Mfg Co
QUINCY Mfg Co
QUINORGOD-Johns-Manwille
QUINTERRA—Johns-Manwille
QUINTERRABORD—Johns-Manwille
QUINTERRABORD—Johns-Manwille
QUINTERRABORD—Johns-Manwille
QUINTERRABORD—Johns-Manwille QWIK-CHANGE—Square D Co QWIK-OPEN—Square D Co

R-ASE—All Steel Equipment Inc RABC—Reynolds Metals Co R-B-M Div Essex Wire Corp 131 Godfrey St Lo-R-B-M Div Essex Wire Corp 131 Godfrey St Logansport Ind
RCA—Radio Corp of America
RCD—Rotary Concrete Drill Co
RCS Tool Corp 227 E Front St (P 0 Box 661)
Bloomington III
RCS Tool Sales Corp—see RCS Tool Corp
RE—Revaland Electric Co
R & IE Equipment Div—see 1-T-E Circuit Breaker CoR/M—Ruggles Klingemann Manufacturing Co
R/M—Raybestos-Manhattan Inc

POSITROL-S & C Electric Company

R & M-HUNTER—Hunter Div
RPM—Montgomery & Company Inc
RS—River Smelting & Refining Co
R/S—Refrigerating Specialties Co
R T & E CO—see R T & E Corp
R T & E Corp 1900 East North St. Waukesha Wis
RWP—Line Material Co
Rab Electric Mfg Co Inc
Rab Electric Mfg Co Inc
Racine Electric Products—see Howard Industries Inc
RACO—All-Steel Equipment. Inc
RADARANGE—Raytheon Mfg Co
RADI-AIRE—Reynolds Electric Co
RADI-AIRE—Reynolds Electric Co
RADIA-AIRE—Reynolds Electric Co
RADIA-AIRE—Reyno Jersey
PADIANTGLASS—Allied Precision Industries RADIANTGLASS—Allled Precision Industries
RADIASTAT—Ward Leonard Electric Co
Radio Corp of America Industrial Electronic Products
Front & Cooper Sts Camden 2 NJ
Radio Frequency Laboratories Inc Boonton NJ
Radio Receptor Co Inc 240 Wythe Ave Brooklyn 11 NY
RADIOCARB—Driver (Wilbur B) Co
Radionic Transformer Co 411 South Sangamon St
Chicago 7 Illinois
RADIX—Versen (Kurt) Company
Radix Wire Co 26260 Lakeland Blvd Cleveland 32 Ohio
RADOR—Atlas Overhead Door Co
Rae Motor Corp 2009 Kewaunee St Racine Wis
RAILITE—Amplex Div Chrysler Corp
RAINTER—American Crossarm & Conduit Co
RAISTD Lat Makepeace (DE) Co
RAISTT—Cope (TJ)
RAKSCOPE—Waterman Products Inc
Raico Mfg Co 123-41 N Albany Ave Chicago 12 III
RAM—Diamond Expansion Bolt Co Inc
RAMAC—Rattan Mfg Co
Rambusch Decorating Co 40 W 13 St New York 11 Ramco Mfg Co 540 Westfield Ave W Roselle Park NJ
Ramset Div Olin Mathieson Chemical Corp—see Ramset
Fastening System Winchester-Western Div Olin
Mathieson Chemical Corp
Ramset Fasteners Inc—see Ramset Fastening System
Winchester-Western Div
Olin Mathieson Chemical Corp
Ramset Fastening System Winchester-Western Div
Olin Mathieson Chemical Corp 12117 Berea Rd
Cleveland 11 Ohio
RANCH-AIRE—Cool-etts Inc
RANCHO—Western Insulated Wire Co
RANCHO—Western Insulated Wire Co
RANCHO—Western Insulated Wire Co
RANCHO—Western Insulated Wire Co
RANGEL ONNECTORS—Frankel Connector Co
RANGEL ONNECTORS—Frankel Connector Co
RANGEL System Connector Co
RANGESTUD—Frankel Connector Co
RANGETAP—Frankel Connector Co NY
Rapid Electroplating Process Inc 1414 South Wabash
Ave Chicago 5 Illinois
RAPIDUCTION—Oster Mig Co
RATOLARM—Fischer & Porter Co
Rattan Mig Co 10 Wall St (P 0 Box 1745) New
Haven 7 Conn
Rattray (George) & Co 116-08 Myrtle Ave Richmond
Hills 18 NY Con 3835 West Addison St Chicago Rauland-Borg Corp 3535 West Addison St Chicago 18 TIL RAWLDRIL—Rawiplug Co Inc
RAWLDRIVE—Rawiplug Co Inc
Rawiplug Co Inc 212 Petersville Rd New Rochelle Rawiplug Co Inc 212 Petersville Rd New Rochelle NY
RAY-LINE—Portable Light Co Inc
RAY MAN—Raybestos-Manhattan Inc
RAY-0-MATIC—Electric Cord Co
RAY-VEC—Electrend Products Corp
Raybestos-Manhattan Inc 61 Willett St
Raydyne Corp 2715 5 Fourth St (P 0 Box 1147)
Springfield III
RAYESGENT—Westinghouse Electric Corp
Raytheon Mfg Co Commercial Equipment Div 100
River St Waltham 54 Mass
RE-CIRK-IT—Heineman Electric Co
REACTROL—General Electric Co
REACTROL—General Electric Co
REACTROL—Ward Leonard Electric Co
Reading Chain & Block Corp—see Reading Crane &
Hoist Corp
Reading Crane & Hoist Corp 2100 Adams St Reading
Pennsylvania Reading Crane & Hoist Corp 2100 Adams St Reading Pennsylvania Reading Pennsylvania Reading Pennsylvania Reading Works—see Triplett Electrical Instrument Corporation of the Pennsylvania Reading Penns RECTOX—Westinghouse Electric Corp RED ARROW—Lift Trucks Inc RED BAND—Howell Electric Motors Co

RED CENTER—Klein (Mathias) & Sons
RED "D"—Diamond Wire & Cable Co
RED-D-PRENE—Diamond Wire & Cable Co
RED GIT—Mason (L E) Co
RED GIANT—Revolvator Co
RED-LUX—Duro Test Corp
RED RYDER—Industrial Products Co
Red Seal Electric Co 10307 Detroit Ave Cleveland 2 Ohio

REDEGE—National Electric Products Corp
Redi-Boit Inc 5334 Indianapolis Blvd East Chicago
Ind
REDI-FAB—Barber-Greene Co REDI-FAB—Barber-Greene Co
REDI-FLOW—Barber-Greene Co
REDI-HEAT—Knapp-Monarch Co
REDI-ROD—Redi-Bolt Inc
REDILIFIT—Lewis-Shepard Products Inc
REDMOND—Cyclo-Freez Corp
REDDME—Versen (Kurt) Co
REDTOP—Leibfried (C H) Mfg Corp
REDUCO—Versen (Kurt) Co
REDTOP—Leibfried (C H) Mfg Corp
REDUCO—Versen (Kurt) Co
Redi-O-Matic Corp of America—see Columbia Products
Inc Inc
Reed-Unit-Fans Inc 1001 St Charles Ave New Orleans La Reel-O-Matic Corp of America—see Columbia Products RELITE—Hykon Mfg Co REELITES—Appleton Electric Co Reeve Electric Co Inc 120 W 42 St New York 36 NY NY
Reeve Electronics Inc 609 W Lake St Chicago 6 III
REEVELEC—Reeve Electronics Inc
Refinery Supply Co—see Central Scientific Co
REFLECTO—Appleton Electric Co
REFLEX—Versen (Kurt) Company
REFRACTOLINS—Holophane Co Inc
Refrigerating Specialties Co 3004 W Lexington St
Chicago 12 III
REG-AMP—Electric Machinery Mfg Co
REGAL-LITE—Kenworth Co REG.AMP.—Electric Machinery Mfg Co REGAI-LITE—Kenworth Co REGAITON.—Electronics Measurements Co Inc REGENT.—Miller Co REGOIM.—Electric Regulator Corp REGULEX.—Allis-Chalmers Mfg Co REGULITE.—Ward Leonard Electric Co REGULITE.—Ward Leonard Electric Co REGULITE.—Ward Leonard Electric Co Reighert. Float and Mfg Co 2242 Smead Ave Toledo Reighert. Float and Mfg Co 2242 Smead Ave Reichert Float and Mfg Co 2242 Smead Ave Toledo 6 Ohio REIGNSEAL—Peters Mfg Co REIGNSEAL—Peters Mfg Co REIGNSEAL—Peters Mfg Co RELUST—Versen (Kurt) Company RELAY-AMP—Goldak Co RELENS—Versen (Kurt) Co RELENS—Versen (Kurt) Co RELENS—Versen (Kurt) Co RELENS—Versen (Kurt) Co RELENS—Company RELAY-Standard Electric Co Inc Reliable Battery Co—see Standard Electric Co Inc Reliable Battery Co—see Standard Electric Co Inc Reliable Battery Co—see Standard Electric Co Inc ReliaNCE—United States Steel American Steel & Wire Div Reliable Battery Co—see Standard Electric Co Inc
RELIANCE—Trine Manufacturing Corp
RELIANCE—United States Steel American Steel &
Wire Div
Reliance Automatic Lighting Co 1927-29 Mead St.
Racine Wisconsin
Reliance Electric & Engineering Co 24701 Euclid Ave
Cleveland 17 Ohio
Reliance Electric & Engineering Co Master Electric
Div 126 Davis Ave Dayton 1 Ohio
RELIATRON—Westinghouse Electric Corp
RELOID—Guardian Electric Mfg Co 1621 W Walnut
St Chicago 12 III
RELOU—Versen (Kurt) Company
RELUX—Versen (Kurt) Company
RELUX—Versen (Kurt) Company
REMCON—Pyramid Instrument Corp
Remington Corp Remington Air Conditioning Div Willey St Auburn NY
Remington Arms Co Inc 939 Barnum Ave Bridgeport
Connecticut
REMOTROL—Midwest Electric Products Inc
REMOTROL—Midwest Electric Products Inc
REMOTROL—Templeton Kenly & Co
REPAR—Versen (Kurt) Co
RESISTOY—G & W Electric Specialty Co
RESISTOY—G & W Electric Specialty Co
RESISTOY—G & W Electric Specialty Co
RESPOT—Versen (Kurt) Company
RETEP—Hitemp Wires Inc
RETERACT-O-REEL—Appleton Electric Co
Revaluad Electric Co
Reverse Cooper & Brass Inc 230 Park Ave
NY 17 NY
Revere Cooper & Brass Inc 230 Park Ave
NY 17 NY
Revere Cooper & Brass Inc 230 Park Ave
NY 17 NY Calif
Revere Copper & Brass Inc 230 Park Ave NY 17 NY
Revere Electric Mfg Co 7420 N Lehigh Ave Chicago
48 III
REVMASTER—Opad Electric Co
Revolvator Company 86th St at Tonnelle Ave Rts
1 & 9 North Bergen New Jersey
REVUE—Versen (Kurt) Co
REX—Peer Inc
REX—AIRATE—Cleveland Heater Co Air Controls Inc Div REX-TUBE—Flexonics Corp
REX-TUBE—Flexonics Corp
REX Welder & Engineering Co 1200 Milton St Benton
Harbor Mich
REX Welder Sales Co—see Universal Electric Sales Corp
REXWELD—Crucible Steel Co of America
REXSELEN—Knopp Inc
REXSELEN—Knopp Inc
REXSELEN—Crucible Steel Co of America
REXISTAL—Crucible Steel Co of America
RHINOBESTOS—Westinghouse Electric Corp
Rhode Island Insulated Wire Co Inc 50 Burnham
Ave Cranston RI
Rhodes (M H) Inc _30 Bartholomew Ave Hartford 6
Conn

Rich (Phil) Fan Mfg Co Inc 2900 Caroline Houston 4 Texas Rich Lamp Mfg Co—see Stabrite Fivorescent Mfg Co Richards J Ri Co P O Box 482 Carnegle Pa Richards Mfg Co Ltd 25 Rankin St Newark 3 New Jersey RICHMOND—Miller Co RICHMOND—Miller Co
RID-ALL—Estellite Co Inc
RID-ALL—Estellite Co Inc
RIDGOIL—Ridge Tool Co
RIDGOIL—Ridge Tool Co
RIGID—Ridge Tool Co
RING CALL—Edwards Co Inc
RIPFLEX—Continental Copper & Steel Indus Inc
field Wire & Cable Div
Rijbey Co Inc Factory St Middletown Conn
RISERTHERM—Mercoid Corp
RITEOHM—Ohmite Manufacturing Co
Rittenhouse Company Inc East St Honeoye Falls New
York Rittenhouse Company Inc East St Honeoye Falis New York
York
River Smelting & Refining Co 4195 Bradley Rd (P 0 Box 5755) Cleveland 1 Ohio Riverside Mfg & Electrical Supply Co 10228 Michigan Ave Dearborn Mich RIVIERA—Appleton Electric Co RO LON—Rome Cable Corp RO SEAL—Rome Cable Corp RO SEAL—Rome Cable Corp RO-TITE—Curtis Lighting Inc ROBARN—Rome Cable Corp Robbins & Myers Inc 1345 Lagonda Ave Springfield Ohio Roberson Inc 1539 E 103 St Seattle 55 Wash-Roberson Inc 1539 E 103 St Seattle 55 Washington Ington
Roberson (LN) Co—see Roberson Inc
Robertson & Ruth 460 W Lake St Elmhurst III
ROBINTRONIC—Hewitt-Robins Inc
ROBOT—Miller Harris Instrument Co
Robot Appliances Inc 7041 Orchard St Dearborn Mich
ROBOT-EYE—Heat-Timer Corp
ROBOTROL—Reliance Automatic Lighting Co
ROCK BRAND—Welss & Bihelier Merchandise Corp
Rockbestos Products Corp Nicoll & Canner Sts New
Haven 4 Connecticut
Rocket Devices Corp—see Star Expansion
Rocket Distributors Inc—see North Shore Nameplate Rocket Devices Corp—see Star Expansion
Rocket Distributors Inc—see North Shore Nameplate
Inc
Rockford Wire Stripper Co—see Speedex Mfg Co
ROCKING CONTACT—Allis-Chaimers Mfg Co
ROCKING CONTACT—Allis-Chaimers Mfg Co
RODAR—Driver (Wilbur B) Co
RODAR—Driver (Wilbur B) Co
Rodale Manufacturing Co Inc Sixth & Minor Sts
Emmaus Pennsylvania
Roebling's Cons Corp
ROEGLAD—Roebling's Sons Corp
ROEGLAD—Roebling's Sons Corp
ROECAD—Roebling's Sons Corp
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ROEGLAS—Roebling's Sons Corp
ROEGLAS—Roebling's Sons Corp
ROEFRENE—Roebling's S PORTIANG 5 UP OF THE PROPERTY Ohio
ROLLAIRE—Ilg Electric Ventilating Co
Roller (Wm G) Inc 159 Liberty Ave Mineola New Roller (Wm G) Inc 159 Liberty Ave Mincola New York
ROLLEREEL—Suttle Equipment Co
ROLLO-COLOR—Luxor Lighting Products Inc
ROLOTAC—Elwell-Parker Electric Co
ROMARINE—Rome Cable Corp
Rome Cable Corp Ridge St Rome
ROME-RIGID—Rome Cable Corp
ROMEX—General Cable Corp
ROMEX—General Cable Corp
ROPEX—General Cable Corp
ROPEXE—Rome Cable Corp
ROPEXE—Rome Cable Corp
ROPEXE—Rome Cable Corp
ROPEXE—Rome Cable Corp
ROSIN X—Dunton (M W) Co
Rostan Corporation 5660 59th St Maspeth 78 New
York ROSIN X—Dunton (M W) Co
ROSIAN Corporation 5666 59th St Maspeth 78 New
York
Rotary Concrete Drill Co 650 S Arroyo Parkway
Pasadena 1 Calif
ROTISS-A-RANGE—Odin Stove Manufacturing Co
ROTO-BIN-DICATOR—Bin-Dicator Co
ROTO-BIN-DICATOR—Bin-Dicator Co
ROTO-BIN-REREA—Acromark Co
ROTO-PUSH—Cutler-Hammer Inc
ROTO-BIRCKER—Crane-Veyor Corp
ROTO-STRIP—Neo-Ray Products Inc
ROTO-TORK-Haydon (A W) Co
ROTO-TROL—Haydon (A W) Co
ROTO-TROL—Haydon (A W) Co
ROTO-ROTOR—SINGER CORP
ROTORER—Westinghouse Electric Corp
ROTOROPOT—Rambusch Decorating Co
ROTOROPOT—Rambusch Decorating Co
ROTOROPOT—Rambusch Decorating Co
ROTOROPOT—Rambusch Decorating Co
ROTOROPOT—Westinghouse Electric Corp
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ROTOROPOT—Rambusch Decorating Co
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ROTOROPOT—Rambusch Co
ROTOROPOT—Rambusch Co
ROTOROPOT—Color Mestinghouse Electric Corp
ROTOROPOT—Color Mestinghouse Electric Ohio
ROUND-WOUND—Line Material Industries ROV-A-LITE—Terado Co ROYAL—Waveland Electric Co Royal Electric Company Inc—see Royal Electric Corp 69

Royal Electric Corp 95 Grand Ave Pawtucket RI
Royal Electric Mfg Co 1122 E 87 St Chicago 19 III
ROYAL-LAGA—Royal Electric Corp
ROYAL-NOARK—Royal Electric Corp
ROYAL-NOARTO—Standard Electric Time Co
ROYALOK—Royal Electric Corp
ROZONE—Rome Cable Corp
RUBBOR SOLIDER—All-State Welding Alloys Co Inc
RUBBOR SOLIDER—All-State Welding Alloys Co Inc
RUBBRE—Co-operative Utilities Co Inc
RUBRET—Co-operative Utilities St Inc
RUBRETIE—Co-operative Utilities St Inc
RUBRETIE—Co-operative Utilities Co Inc
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RUBRETIE—Co-operative Utilities Co Inc
RUBRETIE—Co-operative Utilities St Inc Rusgreen Mfg Co 14202 Birnood Are igan
RUSH—Eraser Company Inc
Rush Wire Stripper Div Eraser Co Inc 1068 Clinton
St Syracuse 4 NY
Russell & Stoll Co Inc 125 Barclay St NY 7 NY
RUSSELL & Stoll Co Inc 125 Barclay St NY 7 NY
RUST BOND—Carboline Co
Rust-Oleum Corp 2425 Oakton St Evanston
RUST-SHIELD—Wilbur & Williams Co
RUSTICLITE—Gruber Bros Inc
Ryther Purdy Lumber Co 501 Tiffany St NY 59 NY

S

S

S & C Electric Company 4435 Ravenswood Ave Chicago 40 Illinois
CSBCO—Southern Carbon Brush Co Inc
SCP—Superior Carbon Products Co
SI E—Southwestern Industrial Electronics Co
SI E—Sherman & Reilly Inc
SRB—Marlin Rockwell Corp
SA.T.R.—Beffrey MMg Co
SI E—Swedish Iron & Steel Corp
SAFISE—Electric Machinery MMg Co
SACO—Stephens-Adamson Mfg Co
SACO—Stephens-Adamson Mfg Co
SACO—Stephens-Adamson Mfg Co
SACO—Stephens-Adamson Mfg Co
SAFIST—TAR—United Electric Motor Co
SAFIST—TAR—United Electric Corp
SAFIST—TAR—Mestinghouse Electric Corp
SAFIST—TAR—Mestinghouse Electric Corp
SAFIST—TAR—Mestinghouse Electric Corp
SAFIST—TAR—Westinghouse Electric Corp
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SAFIST—TAR—Mestinghouse Electric Corp
SAFIST—Mathem Ming Co
Safety Belt-Lacer Co—see Armstrong—Bray & Co
Safety Elvi Line Tool Co 973—Beth Ave Qakiand 21
Calif Safety Belt-Lacer Co—see Armstrong—Bray & Co
Safety Live Line Tool Co 973—Beth Ave Qakiand 21
Calif Safety Belt-Lacer Co—see Armstrong—Bray & Co
Safety Live Line Tool Co 973—Beth Ave Qakiand 21
Calif Safety Belt Lacer Co—see Armstrong—Bray & Co SAFETECH—Capewell Mfg Co
Safety Belt-Lacer Co—see Armstrong-Bray & Co
Safety Belt-Lacer Co—see Armstrong-Bray & Co
Safety We Line Tool Co 973-86th Ave Oakland 21
SAFETY M.I.—General Cable Corp
SAFETY VALVE—Bussmann Mfg Div
SAFETY VELLOW—Woodhead (Daniel) Co
SAFEWAY—American Pulley Co
SAFEWAY—Moodhead (Daniel) Co
SAFEWAY—Woodhead (Daniel) Co
SAFEWAY—Square D Company
SAFAEX—Square D Company
SAFAEX—Square D Company
SAFAEST—Heron (M M) & Son
SAFARCH—Chuley Bros
SAFAEST—Fleron (M M) & Son
Safway Steel Products Inc 6234 W State St Milways Louis Brass Co—see Guth (Edwin F) Co
St Louis Malicable Casting Co 7701 N Conduit Ave
St Louis 15 Mo
St Marys Carbon Co State St St Marys Pa
SALADMASTER—Burpee Can Sealer Co
Salem Tool Co 767 S Elisworth Ave Salem Ohio
SALI—Adalet Mfg Co
Salton Mfg Co Inc 312 E 95 St New York 28 NY
SAMSON—Metaleraft Products Co Inc
SAND BRUTE—Nedco Company
SANDS MUTE—Nedco Company
SANDS MUTE—SANDS MUTE—SANDS MUTE—SANDS MUTE—SANDS MUTE—SANDS MUTE—SANDS MUTE—SANDS MUTE—SANDS MUTE—SANDS

Saxonburg Ceramics P O Box 100 Saxonburg Pennsylvania Savior Electric Products Corp 277 Pierce St Birmingham Mich
SAYLORDUCT—Saylor Electric Products Corp
Scam Instrument Corp 1811 W Irving Pk Rd Chicage
13 111 13 111
Schauer Machine Co—see Schauer Mfg Corp
Schauer Mfg Corp 4500 Algine Ave Rossmoyne Ohio
Schenectady Varnish Co Inc Congress & 9th Sts
Schenectady 1 NY
SCHOOLMASTER—Great Northern Manufacturing Corp
Sclaky Bros Inc 4915 West 67 St Chicago 38
Illinois Illinois
Scientific Electric Inc. 105-109 Monroe St. Garfield SCINTAGUN—Goldak Co
SCOTTAGUN—Goldak Co
SCOTTAGUN—Goldak Co
SCOTTCOTE—Woodward Machine Co
SCOTTCOTE—Winesota Mining and Mfg Co Electrical Products DV
Scott (Hermon Hosmer) Inc 11 Powder Mill Rd
Maynard Mass
SCOTTY—Share Mfg Corp
Scranton Storage Battery Corp
Scranton Storage Battery Corp Archbaid Pa
Scrayco Level Controls—see Scrayco Mfg Co
Scrayco Mfg Co 201 Greene Ave Middlesex NJ
SCRU-ITS—Solar Electric Corp
SCRU-ITS—Solar Electric Corp
SCRU-ITS—Black & Decker Mfg Co
SCRU-ITS—Burndy Corp
SEAL THRU—Eliza Metal Products Co
SEAL TICS—Universal Metal Hose Co
SEALNUT—Radio Frequency Laboratories Inc
SEAL-ITS—American Brass Co
SECONEC—Rusgreen Mfg Co
SECUNETY—United States Rubber Co
SCCUNETY—United States Rubber Co
SCCUNETY—Braret Co
SCUNETY—Sangamo Electric Co
SCCUNETY—Braret Co
SCUNETY-EX—Anaconda Wire & Cable Co
Sceurity Mfg & Contracting Co
SCCUNETY-EX—Anaconda Wire & Cable Co
Sceurity Mfg & Contracting Co
SCCUNETY-EX—Anaconda Wire & Cable Co
SCEUNITY-EX—Anaconda Wire & Cable C N.J SCINTAGUN—Goldak Co SCOT-LITE—Woodward Machine Co SCOTCHCOTE—Minnesota Mining and Mfg Co Elec-16 Minn SELPO—Self-Lifting Plano Truck Co SELTOMEL—Michigan Fluorescent Light Div Sensitive Research Instrument Corp 310 Main St New Rochelle NY Sensitive Research Instrument Corp 310 Main St.

New Rochelle NY

SENTINEL—Clincinnat! Time Recorder Co
SENTINEL—Clincinnat! Time Recorder Co
SENTINEL—Photobell Company
SENTINEL—Photobell Light Co Inc
SENTINEL—United States Rubber Co
SENTINEL—United States Rubber Co
SENTINELL—Elimann Engineering Co
SENTRY-LITE—Scranton Storage Battery Corp
SENTRY-LITE—Scranton Storage Battery Corp
SENTRY-Lite & Battery Div Hobby & Brown Electronic
Corp 27 Sunrise Highway Rockville Centre NY
SENTRY—Industrial Starter Corp
SEPCO—Steel Electric Products Co Inc
SEPRABLE—Appleton Electric Co
SEQUENSTRATY—Sola Electric Co
SEQUENSTRATY—Sola Electric Co
SEQUENSTRATY—Sola Electric Co
SEQUENSTRATY—Sola Electric Co
SEQUENT STATE—MORE COMPANY
SERU-EM-Kearney (James R) Corp
SERVICE BUGS—Frankel Connector Co
SERVICE—MASTER—McCabe-Powers Body Co
SERVICE—MASTER—MCCabe-Powers Auto Body Co
SERVICE—Master—Thompson Electric Co
SERVICE—Burndy Corp
Servisaer—Thompson Electric Co
SERVISLEEV—Hubbard & Co
SERVISLEEV—Hubbard & Co
SERVIT—Burndy Corp
Servisaer—Thompson Electric Co
SERVIT—Burndy Corp
Servisaer—Thompson SESAME—Alliance Mfg Co Inc Seton Name Plate Co 431 W Rock Ave New Haven 15 Conn Conn
Seyler Mfg Co—see Chance (A B) Co
SHAFTROL—Jordan Co Inc
Shalda Mfg Co Inc 156 W Providencia Ave Burbank
Calif California Mig Co 33 Lincoln Ave Collingdale Pa SHALLORAMA—Sunbeam Lighting Co Shaw-Box Grane & Hoist Div Manning Maxwell & Moore Inc Muskepon Mich Shaw Perkins Mfg Co 201 E Carson St Pittsburgh 19

SHAWMUT—Chase-Shawmut Co SHEETFLEXTOS—Keasbey & Mattison Co Shelby Electric Inc East US Highway #421 Shelby-ville Inc omerby Electric Inc East US Highway #421 Shelbyville Ind
Shenango Furnace Co Centrifugally Cast Products Div
West Third St Dover Ohlo
Shenango Penn Mold Co-see Shenango Furnace Co
SHERDUCT—National Electric Products Corp
Sherman and Co-see American Silver Co Inc Industirlal Div
Sherman Industrial Electronics Div of Engineering
Design Inc 108 N Gill St State College Pa
Sherman (H B) Mfg Co 22 Barney Battle Creek
Mich
Sherman & Pallty Control Control Control
Sherman & Pallty Control Mich Sherman & Reilly Inc 1 Broad St Chattanooga 2 Tenn Sherwin-Williams Co 101 Prospect Ave NW Cleve-Sherwin-Williams Co 101 Prospect Ave NW Cleveland 1 Ohio
Shock-PAK—Duro-Test Corp
Shock-Rite Electric Fencer Co—see Electric Service
Systems Inc
SHOCK-STOPS—Connecticut Hard Rubber Co
SHOCK-STOPS—Connecticut Hard Rubber Co
SHOCK-STOPS—Connecticut Hard Rubber Co
SHOCK-STORS—Resident Electric Company Inc
SHOK-BORBER—Royal Electric Company Inc
SHOK-PRUF—Cable Electric Products Inc
SHOKLESS—Kneisley Electric Co
SHOP CADDY—Allied Mfg & Sales Co
SHOP CADDY—Allied Mfg & Sales Co
SHOP LING—Precision Welder Mfg Co
SHOPLIFTER—Economy Engineering Company
Shox-Stok Inc Wellington Ohio
Shrader (FW) Co 11623 B Broadway Los Angeles 61
Calif
Shreveport Engineering Co—see Bar-Brook Mfg Ca Lac Calif
Shreveport Engineering Co—see Bar-Brook Mfg Co Inc
SHUR-MONT—Swivelier Co Inc
Shure Mfg Corp 1601 S Hanley Rd St Louis Mo
SHURESET—Ramset Fastening System
SHURFLO—Anchor Metal Co Inc
SHURESETS 35 Hamilton St New Haven 8 Connecticut
SHURLOK—Pass & Seymour Inc
SHUT-O-VENT—Reed Unit-Fans Inc
SIANOR—Pucel Enterprises Inc
SIANOR—Pucel Enterprises Inc
SIDALARM—New Jersey Fire Alarm Co Inc
SIEDALARM—New Jersey Fire Alarm Co Inc
SIEDALARM—STATE Industrial Electronics
SIEDALARC—Southwestern Industrial Electronics Co
Sierra Electric Corp 15100 S Figueroa Gardena
Calif SIERTA Electric Gorp 15100 S Figueroa Gardena Calif Sierra Electric & Mfg Co—see Sierra Electric Corp SIERRALITE—Sierra Electric Corp SIERRAPLEX—Sierra Electric Corp SIERRAWARE—Sierra Electric Corp SIERRAWARE—Sierra Electric Corp SIERRAWARE—Sierra Electric Corp SIGHT SAVER—Silvray Lighting Inc SIGHTLAND—Lightolier Corp SIGHTLAND—Lightolier Corp SIGHTLAND—Lightolier Corp SIGHTLAND—Lightolier Corp SIGHTLAND—Lightolier Corp SIGHALAMA—Partrick & Wilkins Co SIGNA—Wakefield Co SIGNA—Wakefield Co SIGNA—GLOW—Industrial Development Labs Inc SIGNALMAT—Partrick & Wilkins Co SIGNA—GLOW—Industrial Development Labs Inc Signal Electric Div King-Seeley Corp 1800 13th St Menominee Mich Signal Electric Div King-Seeley Corp Signal Engineering & Mfg Co—see Wheelock Signals Inc 37-41 Neptun Highway Neptune New Jersey Signalite Inc 37-41 Neptun Highway Neptune New Jersey
Signalite Fuse Co—see Signalite Inc
SIL-BOND—United Wire & Supply Corp
SIL-STIC—Dow Corning Corp
SILASTIC—Dow Corning Corp
SILCAD—Yardney Electric Corp
SILCAD—SILCOREST—Silicone Insulation Inc
SILENT BREZZE—Meler Electric & Machine Co Inc
Silent Hoist & Crane Co 841-63rd St Brooklyn 20 NY
SILENT-KING—Cable Electric Products Inc
SILENT SENTINELS—Westinghouse Electric Corp
SILENTVANE—Westinghouse Electric Corp
SILEC-0-NETIC—Heinemann Electric Co
SIIICo-0-BritC—Heinemann Electric Co
SIIICone Insulation Inc 1383 Seabury Ave Bronx 61 Silicone Insulation Inc 1383 Seabury Ave Bronx 61 NY
SILOTEX—Anaconda Wire & Cable Co
SILTUBE—All-State Welding Alloys Co Inc
SILV-BR DOT—Silvray Lighting Inc
SILV-BR DOT—Silvray Lighting Inc
SILVER FLASH—Borg-Warner Corp
SILVER KING—Boston Woven Hose & Rubber Co
SILVER FLASH—Borg-Warner Corp
SILVER STOPT—Silvray Lighting Inc
SILVER STOPT—Silvray Lighting Inc
SILVER STEEL—Borg-Warner Corp Atkins Saw Div
SILVER STEEL—Borg-Warner Corp Atkins Saw Div
SILVER STEEL—Pardney Electric Corp
SILVERCEL—Yardney Electric Corp
SILVERCEL—Yardney Electric Corp
SILVERLINE—Thor Power Tool Co
SILVERSTAT—Westinghouse Electric Corp
Silvey Pipe Bender Co 2215 Brighton Ave Kansas
City Pipe Bender Co 2215 Brighton Ave Kansas
City 27 Mo
Silver Lighting Inc 100 W Main St Bound Brook
NJ
SIM-PLY-TROL—Assembly Products Inc
Simmonds Aerocessories Inc Tarrytown
Simmonds Saw and Steel Co 470 Main St Fitchburg
Mass Simonds Saw and Steel Co 470 Main St Fitchio
Mass
Simonski (G S) Co—see Lucifer Furnaces Inc
Simplet Electric Co—see Ideal-Simplet Fittings Inc
SIMPLEX—Templeton Kenly & Co
SIMPLEX—Welss & Biheller Merchandise Corp
Simplex Co 1139 N MacArthur Blv d Springfi
III III SImplex Jack Co—see Templeton Kenly & Co
SIMPLEX JENNY—Templeton Kenly & Co
Simpler Time Recorder Co 24 Lincoln St Gardner
Mass
Simplex Wire & Cable Co 79 Sidney St Cambridge
39 Massachusetts
Simplytrol Company—see Assembly Products Inc
Simpson Co 1060 E 11 St Oakland 6 Calif

Simpson Electric Co 5200 W Kinzie St Chicago 44
III
Simpson (Mark) Mfg Co Inc 32-28 49th St Long
Island City 3 NY
Simpson Screen Co—see Simpson Co
SIOUX—Albertson & Co Inc
SIRENO—Portable Light Co Inc
SIRENO—Portable Light Co Inc
SIRENO—Portable Light Co Inc
SISCO—Swedish Iron & Steel Corp
Sittler Corp 18 North Ada St Chicago 7 Illinois
SIX-WAY—TalBender Inc —
SKANDIA—Eagle Mfg Co
SKEDOODLE—Reynolds Electric Co
SkII Corp 5033 Elston Ave Chicago 30 III
SKLDRILL—SkiI Corp
SKILDRILL—SkiI Corp
SKILDRILL—SkiI Corp
SKILDRILL—SkiI Corp
SKILDRILL—SkiI Corp
SKILDRILL—SkiI Corp
SKILDRILA—SkiI Corp
SKILSAW—SkiI Corp
SKILSAW—SkiI Corp
SKILSAW—SkiI Corp
SKILSAW—SkiI Corp
SKILSAW—SkiI Corp
SKILSAW—SkiI Corp
SKILBRIL—SkiI Corp
SKIP-TIOTH—Nye Tool Co
SKULLIGARD—Mine Safety Appliances Co
SKY-BLAST—Robbins & Myers Inc
SKY-GLO—Benjamin Electric Mfg Co
SKY-GLO—Benjamin Electric Mfg Co
SKY-TIE—Adalet Mfg Co
SKY-TIE—Adalet Mfg Co
SKY-TIE—Adalet Mfg Co
SKY-TIE—Adalet Mfg Co
SKYLIFE—Silvay Lighting Inc
SKYDOME—Nemco Electric Co
SKYLIKE—Silvay Lighting Inc
SKYLOUVER—Electro Silv-A-King Corp
SKYLUNER—Electro Silv-A-King Corp
SKYLUNER—Steetr Mfg Co
SKYLUNER—Steetro Silv-A-King Corp
SKYLUNER—Steetro Silv-Simpson Electric Co 5200 W Kinzie St Chicago 44 Slater Appliances Inc-see Slater Electric & Mfg Co Slater Electric & Mfg Co Inc 45 Sea Cliff Ave Glen Slatier Electric & Mfg Co Inc 45 Sea Cliff Ave Glen Gove NY
SLATER-LOCK—Slater Electric & Mfg Co Inc
Slaughter Co College & Young Sts Piqua 5 Ohio
SLEIGH-O-LITES—Cable Electric Products Inc
SLIDALINK—Yorkville Metal Products Co
SLIMFIN—Tuttle & Kift Inc
SLIMKIN—Tuttle & Kift Inc
SLIMKIN—Pymouth Rubber Co Inc
SLIPKNOT—Plymouth Rubber Co Inc
SLIPKNOT—Eagle Electric Mfg Co Inc
SLIPSYN—Westinghouse Electric Mfg Co Inc
SLO-SPEED—Sterling Electric Mfg Co Inc
SLO-SPEED—Sterling Electric Mfg Co Inc
SLO-SPIAL—New England Carbide Tool Co Inc
SLUGIN—Star Expansion
SLYVER-CLAD—C & D Batterles Inc
Small Motors Inc 2076 Elston Ave Chicago 14
Illinois Small Motors Inc. 2076 Elston Ave Chicago 14

Illinois

MALL TALK—Simpson (Mark) Mfg Co Inc
Smith Doland—see Electric Arc Inc
Smith Doland—see Electric Arc Inc
Smith Mfg Co FA—see Fasco Industries Inc
Minneapolis 14 Minnesota
Smithcraft Lighting 217 Everett Ave Cheslea 50

Mass
SMITTY—Hunter Tools
Smoot Engineering Co—see Republic Flow Meters Co
Smooth-Holman Co 321 N Eucalyptus Ave (P O Box
4097) Inglewood Calif
SMOOTHJAW—Champion DeArment Tool Co
SMAKE CHARMER—Barth Corp
SMAP-IN—Reichert Float & Manufacturing Co
SMAP-LOK—National Acme Company
Snap-on-Tools Corp 8028 28th Ave Kenosha
SMAP STRAP—Blackhawk Industries
SMAPAC—Controls Co of America
SMAPEE—Woodhead (Daniel) Co
SMAPIO—Star Expansion
SMAPTIA—Cable Electric Product Inc
SMOFILAKE—Curtis Lighting Inc
SMORILE—Memoc Electric Corp
SNUB-SEAT—Anderson Electric Corp
SNUB-SEAT—Anderson Electric Corp
SNUB-SEAT—Anderson Electric Corp
SNUB-SEAT—Anderson Electric Corp
SNUGPET —Paine Co
Snayder (M L) & Son Inc 1897 E York St Phil-SNUB-SEAT—Anderson Electric Corp
SNUGFIT—Paine Co
SNUG-SEAT—Anderson Electric Corp
SNUGFIT—Paine Co
Snyder (M L) & Son Inc 1897 E York St Philadelphia 25 Pa
So-Cal Electro Products Inc 4423 W Jefferson Blvd
Los Angeles 16 Calif
Soapstone Co—see Soapstone Duct Co
Soapstone Duct Co 3995 Beach St Oakland Calif
SODERTITE—G & W Electric Specialty Co
Sola Electric Corp 121 Central Ave Warren Pa
SOLAR GLOW—WestInghouse Electric Corp
Solar Light Mfg Co 400 N Ashland Chicago 22 III
SOLARLITE—Solar Light Mfg Co
SOLAVOLT—Sola Electric Corp
SOLAVOLT—Sola Electric Corp SOLAVOLT—Sola Electric Co
SOLDERALL—Brach Manufacturing Corp
SOLDEREZE—Phelps Dodge Copper Products Corp
SOLDEREZE—Phelps Dodge Copper Products Corp
SOLDERMASTER—Hexacon Electric Co
SOLLSTRAND—AMP Inc
SOLLITE—Westinghouse Electric Corp Lighting Div
Solux Corp 56-17 28th Ave Woodside 77 L1 NY
SOLVO-STAT—Hoyt Mfg Corp
Sontone Corp Battery Div Elmsford NY
Soreng Div—see Controls Co of America
Soreng Products Corp—see Controls Co of America
Sorensen & Co Inc Richards Ave Milwaukee
4 Wis

Sorgel Transformer Co—see Sorgel Electric Co SOUND GUARD—Progress Mfg Co Inc South River Metal Products Co Inc 377 Turnpike South River NJ South Chester Corp Lester Pa Southeast Lighting Inc 521 E 20th St Charlotte 1 Southeast Lighting Inc 521 E 20th St Charlotte 1 NC
Southern Carbon Brush Co Inc 7-18th St SW (P 0 80x 1710) Birmingham B Ala
Southern Electrical Equipment Co 308 West Bland St Charlotte 3 North Carolina
Southwestern Industrial Electronics Co 2631 Post Oak
Rd (P 0 80x 13058) Houston 19 Tex
Southwire Company Inc Carrollton Georgia
SOVEREIGN—Miller Co
SPACE-LITER—Sun-Lite Mfg Co
SPACE-LITER—Sun-Lite Mfg Co
SPACE-SAVER—Hyster Co
SPACE-SAVER—Hyster Co
SPACE-SAVER—Hyster Co
SPACE-SAVER—Hyster Co
SPACE-SAVER—Hyster Co
SPACE-SAVER—Hyster Co
SPACIALITE—Ainsworth Lighting Inc
SPACE SAVER—Hyster Co
SPAC Spaulding Fibre Company Inc 310 Wheeler St Tonawanda New York
SPAULDITE—Spaulding Fibre Company Inc
SPAULDO—Spaulding Fibre Co Inc
SPEAR—Jordan Co
SPECIAL ELECTRIC—Ludlow Mfg & Sales Co
SPECIAL ELECTRIC—Ludlow Mfg & Sales Co
SPECIAL ELECTRIC—Ludlow Mfg & Soles Co
SPECIAL ELECTRIC—Ludlow Mfg & Corp
SPEED HATER—Westinghouse Electric Corp SPEED HEATER—Westinghouse Electric Corp
SPEED-LINE—Garcy Lighting Div Garden City Plating
& Mig Co
SPEED-LOK—Cable Electric Products Inc
SPEED-HAMITIC—Beaver Pipe Tools Inc
SPEED-HRU—Mercury Hydraulics
SPEED-HRU—Mercury Hydraulics
SPEED-THRU—Mercury Hydraulics
SPEED SPIRAL—Super Tool Co
SPEED SPIRAL—Super Tool Co
SPEED TOOLS—Thor Power Tool Co
SPEED TOOL—Sterling Electric Motors Inc
SPEED TOOL—Sterling Electric Motors Inc
SPEED WALL—Versabar Corp
SPEED MALL—Versabar Corp
SPEEDLEY—General Cement Mig Co
SPEEDWALL—Versabar Corp
SPEEDLEY—General Cement Mig Co
SPEEDLIFT—Lewis-Shepard Products Inc
SPEEDLIFT—Lewis-Shepard Products Inc
SPEEDLIFT—Lewis-Shepard Products Inc
SPEEDLOKE—Wato Mig Co
SPEEDMASTER—Accurate Engineering Co
SPEEDMASTER—Accurate Engineering Co
SPEEDMASTER—Accurate Engineering Co
SPEEDMASTER—Peck A Harvey Mig Corp
SPEEDMANER—Master Electric Company
SPEEDRANGER—Master Electric Div Reliance Electric
& Engineering Co
SPEEDSET—Waton Mig Co
SPEEDWAY—Wright Hoist Div American Chain &
Cable Co Inc
SPEEDY-ALL—North Shore Nameplate Inc SPEEDWAY—Wright Holst Div American Chain & Cable Co Inc
SPEEDY-CALL—North Shore Nameplate Inc
SPEEDY-MAX—North Shore Sho Spero Electric Corp 20500 St Clair Ave Cleveland 17 Ohio Sperti Faraday Inc 1322 E Church St Adrian Mich SPHERE—Versen (Kurt) Co SPHEROLITE—Line Material Industries Sples Electric Works 564 W Van Buren St Chicago 7 III 7 III
SPINFAST—Scranton Storage Battery Corp
SPIRAFIL—Phelps Dodge Copper Products Corp
SPIRAFLEX—General Insulated Wire Works Inc
SPIRAKORE—General Electric Co Apparatus Sales SPIRAL WRAP—Humitronic Engineering
SPIRAL WRAP—Humitronic Engineering
SPIRALOK—American Metal Moulding Co
SPIRALON—Suprenant Mfg Co
SPIRALOM—Westline Products Div Western Lithograph SPLAC—Westline Products Div Western Lithograph Co SPLICE CAPS—Buchanan Electrical Products Corp SPORTLITE—Duro-Test Corp SPORTLITE—Duro-Test Corp SPORTO—Appleton Electric Co SPORTSLITER—Steber Manufacturing Co SPORTSLITER—Steber Manufacturing Co SPORTSLITER—Steber Morth Adams Massachusetts Sprague Specialties Co—see Sprague Electric Co SPRAYLITE—Silvary Lighting Inc SPRAYO X—Preformed Line Products Co SPRING-ACT-O—Waage Manufacturing Co Spring City Electrical Mfg Co Spring City Pennsylvania Spring City Fundry Co—see Spring City Electrical Spring City Foundry Co—see Spring City Electrical
Mfg Co Spring Load Mfg Corp 6332 Maynard Ave Seattle Wash
SPRING-O-MATIC—Industrial Electrical Works
SPRING-TITE—U S Expansion Bolt Co
SPRING-WING—Rawlpilog Co Inc
SPRINGHIM—Star Expansion
SPRINGWING—Palme Company
Square D Company 6060 Rivard St Detroit 11 SQUARE DUCT—Square D Co SQUEEZON—Kearney (James R) Corp STA-KON—Thomas & Betts Co

Sta-Rite Electric Products Co-see Stabrite Fluorescent Sta-Hite Electric Products Co—see Stabrite Fluorescent
Mfg Co
Sta-Tite Mfg Co 2000 Wyandotte Kansas City 8 Me
Sta-Warm Electric Co 533 North Chestnut Ravena Ohio
STAB-LOK—Federal Electric Products Co
STABLI-GLOW—Blue M Electric Co
STABLI-GLOW—Blue M Electric Co
STABIL-MERM—Blue M Electric Co
STABIL-GLOW—Blue M sylvania Stahl Metal Products Inc 3490 W 140 St Cleveland Stahl Metal Products Inc 3490 W 140 St Chercam-11 Ohio STAIRMASTER—Fairbanks Co STAKLITE—Appleton Electric Co STALEY—Electric Switch Corp Stamford Lighting—see Stamford Metal Specialty Co STALEY—Electric Switch Corp
Stamford Lighting—see Stamford Metal Specialty Co
Inc
Inc
New York 12 New York
Stanat Mfg Co Inc 524 Shames Dr Westbury NY
Stanat Mfg Co Inc 524 Shames Dr Westbury NY
Stanat Tool & Machine Co—see Stanat Mfg Co Inc
STANDARD—Circle F Mfg Co
STANDARD—Specialty Device Co
Standard Electric Co Inc P O Box 6356 San Antonio Standard Electric Co Inc P O Box 6356 San Antonio 12 Tex Standard Electric Manufacturing Co Inc West Berlin New Jersey Standard Electric Time Co 89 Logan St Springfield 2 Mass
Standard Portable Cord Co Inc Mayville NY
Standard Transformer Co 140 Dana St NE Warren
Ohlo Ohio
STANDCO—Sticht (Herman H) Co Inc
STANDCO—General Cable Corp
Stanley-Carter Co—see Stanley Electric Tools
Stanley Electric Tools 436 Myrtle St Ne
Conn New Britain Stankey Verker Stanley Electric Tools Div—see Stanley Electric Manufacturing Co Inc 269 Meserole Stara—A Electric Manufacturing Co Inc 269 Meserole Stara—Expansion Mountainville NY Star Expansion Mountainville NY Star Expansion Bolt Co—see Star Expansion STAR-GLO—Electro Siv-A-King Corp STAR-LINER—Garcy Lighting Div Garden City Plating & Mfg Co STAR-GLO—Electro Silv-A-King Corp
STAR-LINER—Garcy Lighting Div Garden City Plating
& Mfg CO
STAR-LUX—Curtis Lighting Inc
STARBURTE—Connet Lamp Co
Star Light Inc—See Moe Light Inc
STAR-UX—Revere Electric Mfg Co
Star Porcelain Co Mulrhead Ave Trenton 9 NJ
Starrett (LS) Co Athol Mass
START-0-METIC—Airsero Mfg Co Inc
STARELINE—Howard Industries Inc
STARTLINE—Howard Industries Inc
STARTLATOR—Hewson Co Inc
STATICATOR—Hewson Co Inc
STATICATOR—Hewson Co Inc
STATICATOR—Hewson Co Inc
STATICATOR—Hemson Mass
STAZIN—Star Expansion
STAZIN—Star Expansion
STAZIN—Star Expansion
STAZIN—Star Expansion
Stearns Electric Corp
STAYSULTE—Gulter-Hammer Inc
STAYSALITE—Gulter-Hammer Inc
STAYSALITE—Gulter-Hammer Inc
STAYSALITE—Elein (Mathias) & Sons
STAZIN—Star Expansion
Stearns Electric Corp
Stearns Electric Corp
Stearns Magnetic Inc—see Stearns Electric Corp Stearns Electric Corp 120 N Broadway Milwaukee 2 Wisc
Stearns Magnetic Inc—see Stearns Electric Corp
Steber Manufacturing Co 2700 Roosevelt Rd Broadview Illinois
STEBERLITE—Steber Manufacturing Co
Steel City Electric Co 1207 Columbus Ave Pittsburgh Steel City Electric Co 1207 Columbus Ave Pittsburgh 33 Pa Steel Electric Products Co Inc 5602 18th Ave Brooklyn 4 NY Steel and Tubes Inc—see Republic Steel Corp STEELARC—All-State Welding Alloys Co Inc Steelduct Co Republic Bidg Youngstown Ohlo STEELETS—Steel Electric Products Co Inc STEELET—Steel Electric Products Co Inc STEELET—Armstrong-Bray & Co STEELSTHE—Armstrong-Bray & Co STEELITE—Eliza Metal Products Co STEELLITE—Eliza Metal Products Co STEELLITE—Blus Metal Products Co STEELWING—Ilubbard & Co Steiner-lves Co Springfield Rd Union NJ STEP-PAK-Roose (David) Co Inc Steiner-Ives Co Springfield Rd Union NJ
STEP-PAK—Bogen (David) Co Inc
STERILAMP—Westinghouse Electric Corp Lamp Div
STERILAMP—Westinghouse Electric Corp Lamp Div
STERILITE—Moe-Bridges Corp
Sterling Blower Co 791 Windsor St Hartford Conn
Sterling Electric Motors Inc 5401 Telegraph Rd Les
Angeles 22 California
Sternberg Mfg Co 4510 Addison St Chicago 41 III
Stevens Alrearft Corp—see Revere Corp of America
Stevens Appliance Truck Co P 0 Box 897 Norton Rd
Apouts Georgia Stevens Appliance Truck Co P O Box 897 Norton Rd Augusta Georgla
STEWART-AIRE—Stewart Industries Inc Stewart Mrg Co Inc—see Stewart Industries Inc Sticht (Herman H) Co Inc 27 Park Pl NY 7 NY STICKLEBACK—Tec Imports
STINGER—Electric Service Systems Inc STIXWEL—Clifton Mrg Co Inc
STIXWEL—Clifton Mrg Co Inc
STOCK-BIN-LITE—Benjamin Electric Mrg Co
STOCK-BIN-LITE—Benjamin Electric Mrg Co
STOCK-BIN-LITE—Appleton Electric Co
STOCK-FULKER—Rol-Away Truck Mrg Co Inc
Stocker & Yale Inc Green St Marblehead Mass
STOCKLITE—Appleton Electric Co
STOK-FOUNT—International Electric Fence Co Inc
Stokes (F J) Corp 5500 Tabor Rd Philladelphia 20
Pa Stokes (F J) Machine Co—see Stokes (F J) Corp Stonco Electric Products Co 333 Monroe Ave Kenilworth New Jersey Stone Mig Co—see Stonco Electric Products Co Stone Paper Tube Co 900 Franklin St NE Washington 17 DC Stonite Coli Corp U S Hwy 130 Yardville NJ STORACK—American Steel and Iron Works STORAGEMASTER—Heartel (Watter) Co STORE-LITER—Curits Lighting Inc Stow Mig Co 162 Shear St Binghamton NY STRAIGHT LINE—Lyon Rural Electric Co STRAIGHT-LINE—Lyon Rural Electric Co STARIGHT-LINE—Lyon Good Constrained Co 434 Grand St Bridgeport 4 Conn STRAITE-LINE—Profession Mig Co Inc STRAITO-LITER—House-O-Lite Corp STRATO-LITER—House-O-Lite Corp STRATO-LITER—House-O-Lite Corp STRATO-LITER—House-O-Lite Corp STRATO-LITER—Trippe Mig Co STREMELIND—Kiein (Mathias) & Sons STREAMLIND—Kiein (Mathias) & Sons STREAMLIND—Kiein (Mathias) & Sons STREAMLIND—Kiein (Mathias) & Sons STREAMLIND—General Radio Co STRINGER—Utilities Safety Supply Co Inc STRIPSEAL—Burndy Corp STROBOLUME—General Radio Company STROBOLUME—General Radio Company STROBOTAC—General Radio Company STROM—Mariin-Rockwell Corp Stromberg Electric Co—see Stromberg Time Corp Stromberg Time Corp 135 S Main St Themaston Conn STROMGHOLD—Haariz-Mason Inc Stremberg Electric Co—see Stromberg Inne Corp
Stremberg Time Corp 133 S Main St Thomaston
Corn
STRUCTOR—Steel City Electric Co
STRUCTOR—Steel City Electric Co
Struthers-Doun Inc Pitman NJ
STUD PRIVER—Remington Arms Co Inc
STUD-PINE—Fastway Fastemers Inc
STUDPINE—Star Expansion
STUDDIR—Star Expansion
STUDDIR—Subox Inc
SUBMATIC—Frankin Products Corp
STYROFLEX—Natvar Corp
STYROFLEX—Natvar Corp
STYROFLEX—Natvar Corp
STYROFLEX—Natvar Corp
STYROFLEX—Natvar Corp
SUBMATIC—Frankin Electric Co Inc
Subox Inc Fairmount Plant Hackensack NJ
SUBURBAN—Reed Unit-Fans Inc
SUDDEN DEFTH—Paline Company
Suffex Corp 33-40 57th St Woodside 77 New York
Sulfo Inc 1143 E Jersey St Elizabeth 4 NJ
Sultan Electric Co—see Acme Lighting & Mfg Co
Summy Electric Co—see Acme Lighting & Mfg Co
Summy Electric Co—see Acme Lighting & Mfg Co
Summy Pumps Inc P O Box 993 Stamford Conn
SUMPTROL—Square D Co
Sum Electric Products Inc 28 South Day St Orange
New Jersey
Sun-Like Mfg Co 2555 Bellevue Ave Detroit 7 Mich Co
Sundh Electric Co—see Clark Controller Co
SUNETTE—Versen (Kurt) Company
Sunshine CELING—Wakefeld Co
Sunrise Products—see Vemaline Products Co
SUNWITCH—Ripley Co Inc.
SUNWART Inc. 2353 Ft Henry Dr (Box 263) Kingsmont Team SUNWITCH—Ripiey to Inc
Sunwarm Inc 2953 Ft Henry Dr (Box 263) Kingsport Tenn
SUPAIRTHERMAN—Norberg Mfg Co
SUPER CYCLE—Chicage Penemutic Tool Co
SUPER ORCADNAUGHT—Gould-National Batteries Inc
SUPER Grip—Diamend Expansion Bolt Co Inc
SUPER HUSKIE—Mercury Manufacturing Co
SUPER INDUSTRIAL—Method Specialties Co Inc
SUPER HUSKIE—Method Specialties Co Inc
SUPER-LAG—Bussmann Mfg Co
SUPER-LOK—Steber Mfg Co
SUPER MAGNET—Cutter-Hammer Inc SUPER LOK.—Steber Mfg Co
SUPER NAGNET—Cutter-Hammer Inc
SUPER-NEMCOITE—New England Mica Company Inc
SUPER-POWER—Ramset Fastening System
SUPER POWER—Coffing Hoist Div Duff-Norton Co
SUPER SAW—RCS Tool Corp
SUPER SERVICE—General Cable Corp
SUPER SERVICE—General Cable Corp
SUPER-STIK—Superior Insulating Tape Co
SUPER SUTION—National Super Service Co
Super Tool Co 21650 Hoover Rd Detroit 13
Milichigan SUPER XX—Super Flow Solder Co Inc
SUPERAIRE—Remington Corp
ditioning Div
SUPERBUILT—Electrical Mfg Co
SUPERBUILT—Beterical Mfg Co
SUPERIOR—Round (David) & Son Inc
SUPERIOR—Round (David) & Son Inc
SUPERIOR—Round (David) & Son Inc
SUPERIOR—Wall (P) Manufacturing Co
SUPERIOR—Wall (P) Manufacturing Co
Superior American Fire Alarm Div—see Safa Alarm
Div Fyr-Fyter Co
Superior Arbon Products Co 9115 George Avenue
Cleveland 5 Obio
Superior Lectric Co 83 Laurel St Bristol Conn
Superior Electric Mfg Co Inc—see Eagle Electric Mfg
Co Inc
Superior Insulating Tape Co 3100 Lambdin Ave St
Louis 15 Missouri
Superior Interlock Corp 73-39 Cantral Ave Glendale
27 NY
Superior Porcelain Co 931¼ Market St Parkersburg
West Virginia
Superior Staple Mfg Co 40 Commercial St Fitchburg
Mass
SUPERLUSTABLE—Williams (J H) & Co SUPER XX—Super Flow Solder Co Inc SUPERAIRE—Remington Corp Remington Air Con-SUPERJUSTABLE—Wilflams (J H) & Co SUPERLITE-General Cable Corp.

SUPERMARKETER—Miller Co
SUPERRENCH—Williams (J H) & Co
SUPERSEAL—Amaconda Wire & Cable Co
SUPERSEAL—Amaconda Wire & Cable Co
SUPERSHAEATH—General Cable Corp
SUPERSTAR—Stern-Brown Inc
SUPERME—General Cable Corp
SUPERME—General Cable Corp
SUPERME—Collyer Insulated Wire Co
SUPRAMICA—Mycalex Corp of America
SUPREME—Collyer Insulated Wire Co
SUPREME—Callyer Insulated Wire Co
SUPREME—Kaiser Aluminum & Chemical Sales Inc
SUPREME—Kaiser Aluminum & Chemical Sales Inc
SUPREME—Scranton Storage Battery Corp
Supro Lux Mig Co Inc 406-416 E 161 St New York
SI NY
SUR-GROUND—So-Cal Electro Products Inc
SUR-LITE—House-O-Calie Corp SUR-LITE—House-O-Lite Corp SURE-GRIP—Chance (A B) Co SURELITE—Clean Sweep Co Surelite Products Co 386 E 148 St New York 55 NY
Surety Rubber Co North High St. Carrollton. Ohio
SURF-A-LITE—Electre Sllv-A-King Corp
SURF-A-ETCH—Rust-Oleum Corp
SURFA-EELE—Rust-Oleum Corp
SURFACEDUCT—National Electric Products Corp
SURFEX—Pass & Seymour Inc
SURFLENE—Surprenant Mfg Co
SURFLEX—Surprenant Mfg Co
SURFLON—Surprenant Mfg Co
Surprenant Mfg Co
Surprenan ngton St Boston 8 Mass
Surrette Storage Battery Co Inc Jefferson Ave Salem
Massachesetts
SUTCO—Suttom (O A) Corp
Suttle Equipment Co 135 S LaSalle St Chicago 3 III
SURVO—Surprenant Mfg Co
Sutton (O A) Corp 1812 W Second Wichita Kans
SWEATRITE—Dunton (M W) Co
Swedish Iron & Steel Corp 910 Westfield Ave Elizabeth NJ
Swett (A I I) Iron Words 186 Clempood Ave Madina Swett (A L) Iron Works 166 Glenwood Ave Madina NY
SWIFT—Martin Bros Electric Co
SWING-AWAY—Electrical Mfg Co
SWING EASY—Anderson (Albert & JM) Mfg Co
SWING TOP—Electrical Fittings Corp
SWING-WA—General Electric Co Industrial Power
Components Div
Swiss Jewel Co
225 Lafayette Bidg Philadelphia 6
Pennsylvania
SWITCH-KING—Cable Electric Products Inc Components Div
Swiss Jewel Co
Pennsylvania
SWITCH-KING-Cable Electric Products Inc
SWITCH-CHLTE—Hoffman Engineering Corp
SWITCH-GLITE—Hoffman Engineering Corp
SWITCH-QUIK—Vorkville Metal Products Co
SWITCHETE—General Electric Co
SWITCHMAT—Recora Company
SWITCHMAT—Recora Company
SWITCHMAT—Recora Company
SWITCHMAT—Recora Company
SWITCHMAT—Swivelier Co Inc
SWIVELTES—Amplex Corp
SWIVOMATIC—Swivelier Co Inc
SYL-0-BITE—Maymer Corp
SYL-0-WITE—Maymer Corp
SYL-0-ETTE—Maymer Corp
SYL-0-WITE—Maymer Corp
SYL-0-WITE—Maymer Corp
SYL-0-WITE—Maymer Corp
SYL-O-WITE—Maymer Corp
SYL-O-WITE—Maymer Corp
SYL-O-WITE—Maymer Corp
SYL-O-WITE—Maymer Corp
SYL-O-BETC—Norman Corp
SYL-O-WITE—Maymer Corp
SYL-O-WITE—Maymer Corp
SYL-O-Brite—Maymer Corp
SYNCRO-BREAK—Square D Company
SYNCRO-BREAK—Square D T

TA Mfg Corp 4607 Alger St Los Angeles 39 Calif T&B.—Thomas & Betts Co Inc T.D.—Chase-Shawmut Company TEC.—Circle F Mfg Co T.-CRID.—Electric Furnace Co TK.—Tattle & Kift Inc T. Wire Products—see Tevo Insulated Wire T.-W.—Taylor-Winfield Corp TAB-WELD.—Electric Controller & Mfg Co TABLAST.—American Wheelabrator & Equipment Corp Taltco Div Talt Mfg Co 500 Webster St Dayton 1 Ohio Tak Corp.—see Hewson Co Inc Tal Bender Inc.—see Tal Bending Equipment Inc Tal Bending Equipment Inc Tal Bending Legipment Inc Tal Bending Legipment Inc Tal Bending California State Sta

TAP GUN—Black & Decker Mfg Co
TAP IT—Burndy Corp
TAP LITE—Minneapolis-Honeywell Regulator Co
TAP-ON—Tomic Sales & Engineering Co
TAP-ON—Tomic Sales & Engineering Co
TAP-ONS—Tomic Sales & Engineeri Corp echnical Electronics Corp 4060 Ince Blvd Culver Technical Electronics Corp 40b0 Ince Bird Cuiver
City Call
TECHNITE—Capewell Mfg Co
Tectar Products Co Box 209 Union NJ
TEEL—Dayton Electric Co
TEELON—Enjamin Electric Mfg Co
TEFLON—Electronic Mechanics Inc
Tektronix Inc P O Box 831 Portland 7 Ore
TEL-A-PIPE—Westline Products Div Western LithoTectar Control Country Tektronix Inc P O Box 831 Portland 7
TEL-A-PIPE—Westline Products Div Wes
graph Co
TEL-ALARM—Industrial Antomation Corp
TEL-ALARM—Industrial Antomation Corp
TEL-ALARM—Tigerman Engineering Co
TELECO-General Cement Mfg Co
TELECABLE—Whitney Blake Co
TELECABLE—Whitney Blake Co
TELECORD—Whitney Blake Co
TELECORD—Whitney Blake Co
TELECABLE—Automatic Control Co
TELESUCT—Whitney Blake Co
TELESTER—Whitney Blake Co
TELESCAN—Automatic Control Co
TELESCAN—Automatic Control Co
TELESCOPER—Economy Engineering Co
TELESCOPER—Economy Engineering Co
TELESTER—Automatic Control Co
TELESTER—Automatic Control Co
TELESTER—Endinger Blake Co
TELESTER—Butomatic Control Co
TELESTER—Automatic Control Co
TELESTER—Automatic Control Co
TELESTER—Automatic Control Co
TELESTER—Automatic Control Co
TELESTOR—Automatic Control Co
TELETROF—Howard Electric Co
TELETROF—National Electric Co
TELETROF—National Electric Co
TELETROF—National Electric Co -see General Cement TELEVOLT—Sola Electric Co TELEVOX—Westinghouse Electric Corp TEMCO—Electrical Mfg Co TELEVOX—Westinghouse Electric Corp
TEMPCO—Thermo Electric Manufacturing Co
TEMPCO—Thermo Electric Manufacturing Co
TEMPCHER—Thermo Electric Manufacturing Co
TEMPCHEK—Wasge Manufacturing Co
TEMPS—REM—Wasge Manufacturing Co
TEMPS—THEM—Wasge Manufacturing Co
TEMPS—THEM—Wasge Manufacturing Co
TEMPS—TAPPE—Connecticut Hard Rubber Co
TEMPSALL—Tobe Deutschmann Corp
TEMPBRALD—Hitemp Wires Inc
TEMPSULAD—Hitemp Wires Inc
TEMPSULAD—Hitemp Wires Inc
TEMPTEM—Hitemp Wires Inc
TEMPTUR—Hitemp Wires Inc
TEMPTUR—Alliance Milg Co
TENNA-SCOPE—Alliance Milg Co
TENNA-SCOPE—Alliance Milg Co
Tenna-Rube—Javex TENNA-SCOPE—Alliance Mfg Co
Tenna-Tuber—Javex
TENS-A-MATIC—Murray Equipment Co Inc
TENSILOK—General Cable Corp
TENSION—Swivelier Co Inc
TENSITE—Oriver (Wiltow B) Co
TENSOLEX—Tensolite Insulated Wire Co Inc
Tensolite Insulated Wire Co Inc
Tarrytown NY
Tensolite Secretalties Co Inc—ten Tensolite Insulated Tarrytown NY
Tensolite Specialties Co Ino—see Tensolite Insulated
Wire Co Inc
TENSOLON—Tensolite Insulated Wire Co Inc
TENSOLON—Tensolite Insulated Wire Co Inc
TERMEND—Buchanan Electrical Products Corp
Termite Drills Inc 99 N Lotus Ave Pasadena 8
Calif
TESCO—Estaton Secriptor Co. Call TESCO—Eastern Specialty Co TEST-O-LITE—Brach Manufacturing Corp TETCO—Electric Tachometer Corp Texco Insulated Wire 108 E Prospect Ave Burbank Tevco Insulated Wire 108 E Prospect Ave Burbank Calif Calif (Mathias) & Sons TEXAS—Klein (Mathias) & Sons TEXAS—Permacel Tape Corp TEXTOLITE—General Electric Co Chemical & Metai-turyical District Construction (Line) (Li Thermal American Fused Quartz Co 18 Salem St Dover NJ
Thermal Syndicate Ltd American Fused Quartz Co—
see Thermal American Fused Quartz Co
THERMALEZE—Phejs Dodge Copper Products Corp
THERMALEZE—Phejs Dodge Copper Products Corp
THERMALITE—Allis-Chalmers Mfg Co
THERMALL—LaRose (W T) & Associates Inc
THERMALON—Monitor Controller Div Industrial
Electronics Co Inc
THERMALON—Hitemp Wries Inc
THERMASTER—Williard Storage Baitery Co
THERMASTER—Williard Storage Baitery Co
THERMASTER—Williard Steel Industries Inc
THERMACORD—Carey (Philip) Mfg Co
THERMOSRO—Carey (Philip) Mfg Co
Thermo Electric Manufacturing Co 465 Huff St
Dubuque Ilowa THERMO-BORD—Carey (Philip) Mfg Co
Thermo Electric Manufacturing Co 465 Huff St
Dubuque Iowa
THERMO-GRIP—Ideal Industries Inc
THERMO-GRIP—Ideal Industries Inc
THERMO-THIN—Salton Mfg Co Inc
THERMO-TRIEX—Triangle Conduit & Cable Co Inc
THERMO-TRIEX—Triangle Conduit & Cable Co Inc
THERMO-TRIEX—Triangle Conduit & Cable Co Inc
THERMOPHORE—Battle Creek Equipment Co
THERMOPHORE—Hammer Inc
THERMOPHAC—Culter-Hammer Inc
THERMOPHAC—Culter-Hammer Inc
THERMOSTATIC BRAIN—Wall (P) Mfg Co
THIN-PANEL—Garcy Lighting Div
THIMLELYE—Chance (A B) Co
THIN-PANEL—Garcy Lighting Div
THINLINE—Binchell Mfg Co
THINLINE—Mitchell Mfg Co
THINLINE—Supplied Co
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THERMOSTATIC CO ing Div ing Div Thomas Associates—see TA Mfg Corp Thomas & Betts Co Inc 36 Butler St Elizabeth 1 NJ Thomas Instrument Co Box 41 Liverpool Rd Phoenix NY
Thomas (R) & Sons Co—see Delta-Star Electric Div
Thompson Electric Co P O Box 873 Cleveland 22
Ohio Ohio Thompson Mfg Co 611 Stevens St Geneva III THOR—Birdsell Mfg Co Inc Thor Corp 2115 So 54th Ave Chicago 50 III Thor Power Tool Co 175 North State St Aurora Thor Power Tool Co 175 North State St Aurora Illinois
THOREX—Ohio Brass Co
Thread Ezy Mfg Co—see Toledo Pipe Threading Machine Co
THRED O MATIC—Collins Machinery Corp
THREE E—Electrical Engineers Equipment Co
THREE G—Gruber Bros Inc
THREE-UITE—Northern Incandescent Lamp Co
THRIFTY—Marathon Battery Co
THUNDER-TWIST—New England Carbide Tool Co Inc
THUNDERSOLT—Vulcan Electric Co
THYNITE—General Electric Co
THYNITE—General Electric Co
THYRITE—General Electric Co
THYRITE—General Electric Co
TIFFIN—Quincy Manufacturing Co
TIGER—Boston Woven Hose & Rubber Co
TIGER—BILT—Tigerman Engineering Co
TIGER BRAND—United States Steel Corp
Steel & Wire Div
Tigerman Engineering Co
TIGER BILT—Tigerman Engineering Co
TIGER—BOSTON TITLE
THE THOR TITLE THE TI cago 18 III
Tidden Tool Manufacturing Co 209 Los Molinos San
Clemente California
TIMBERHOG—Reed-Prentice Corp
TIME A TROL—Hankscraft Co
TIME-ALL—International Register Co
TIME-MINDER—International Register Co
TIME SPOT——International Register Co
TIME SPOT—Tork Clock Co Inc
TIMEMASTER—Willard Storage Battery Co
Times Appliance Co Wire & Cable Div—see Times
Wire & Cable Co
Times Wire & Cable Co
Times Wire & Cable Co
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Times Wire & Cable Co
Times Wire & Cable Co
Times Wire & Cable Co
Times Wire & Cable Co
Times Wire & Cable Co Wire & Cable Co
Times Wire & Cable Co
Wallingford
Conn
TINOL—American Solder & Flux Co
TINY-GLOW—Industrial Devices Inc
TINY-MITE—Jordan Electric Products Div
TIP-TOP—General Cable Corp
TIPCO—Thayer Industrial Products Co
TIREX—Simplex Wire & Cable Co
TITAN—Detroit Holist & Machine Co
Titcheor (E H) & Co 67 Clinton St
Binghamton
NY
TITE_BIND—Thomas & Patter Co NY
ITTE-BIND.—Thomas & Betts Co
ITTE-BITE.—Thomas & Betts Co
ITTE-BILT.—Phelps Dodge Copper Products Corp
Tobe Deutschmann Corp Providence Highway Norwood
Mass
Tocco Div Ohio Crankshaft Co 3800 Harvard Ave
Cleveland 5 Ohio
Tod-Lite Inc 3401 N W 10 St Oklahoma City Okla
Tod Transformer Corp.—see Todd Products Co Inc
TOG-L-SNAP.—I-T-E Circuit Breaker Co R & IE
Equipment Div Equipment Div

Div Ommutator Co 1101 S Chestnut St Owosso

Mich Toledo Pipe Threading Machine Co 1445 Summit St Toledo 4 Ohio Toledo Standard Commutator Co—see Toledo Com-Toleto Standard Commutator Co-see Toleto Com-mutator Co TOM THUMB—Oster Mfg Co TOMAHAWK—Stevens Walden Inc Tomic Sales & Engineering Co 20000 Sherwood Ave Detroit 34 Mich

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TONG—Curtis Lighting Inc
TONG—TEST—Columbia Mfg Co
TONOTRON—Hughes Products
Topflight Crop 160 E 9th Ave York Pa
Topflight Tool Co—see Topflight Corp
Topflight Tool Co—see Topflight Corp
TOPHBESTOS—Driver (Wilbur B) Co
TOPLITES—Swivelier Co Inc
TOPNOTCH—Day-Brite Lighting Inc
TOPNOTCH—Day-Brite Lighting Inc
TORHOH—MATIC—Velocity Power Tool Co
Tork Clock Co Inc—see Tork Time Controls Inc
Tork Time Controls Inc 1000 Grove St Mt Vernon
NY Tork Time Controls Inc
Tork Time Controls Inc
NY
TORK-TROL—Murray Equipment Co Inc
TORKMASTER—Tork Clock Co Inc
TORKMASTER—Tork Clock Co Inc
TORKOL—Line Material Industries
TORNADO—Brewer Electric Mfg Co
TORPEDO—Swivelier Co Inc
TORREDOR—Trane Co
TORRIDOR—Trane Co
TORRIDOR—Trane Co
TOTALUME—Wilbur & Williams Co
TOUCHETTE—Wilbur & Williams Co
TOUCHETTE—Rodale Mfg Co Inc
Touch-Plate Mfg Corp Box 1970 Long Beach
NJ
TOWER CRAISMEN IN 105 Chestnut St Red Bank
NJ
TOY LIGHT—Aerolux Lights Corp NJ
TOY LIGHT—Aerolux Lights Corp
TRA-BAK—Great Northern Mfg Co
TRAC-O-LITE—Comet Lamp Co
Trade Service Publications Inc 341 Ohio St Chicago
1.1 III
Trade-Wind Motorfans Inc 7755 Paramount Blvd Trade Service Publications Inc 341 Ohio St Chicago 11 III

Trade-Wind Motorfans Inc 7755 Paramount Blvd Rivera Calif

TRADELITER—Duro-Test Corp

TRAFIELX—Crouse-Hinds Co

TRAILBLAZER—Wakefield Co

TRANCELL—Johns-Manwille

Trane Co 2nd & Cameron Ave LaCrosse Wis

TRANOLSEA—Johns-Manwille

TRANOLSEA—Johns-Manwille

TRANOLSEA—Johns-Manwille

TRANSTEE—Johns-Manwille

TRANSPACK—Sangamo Electric Co

TRANSTITE—Johns-Manwille

TRANSPACK—Automatic Transportation Co

TRANSTACKER—Automatic Transportation Co

TRANSTACKER—Automatic Transportation Co

TRANSTACCOR—Automatic Transportation Co

TRANSTER—Hertner Electric Co

TRANSTACCOR—Automatic Transportation Co

TRAP-DEI—Controls Co of America

TRAN-LECTRIC—Terado Co

TRANSTACCOR—Ditman Mig Co

TREE KING—Maxwell Equipment Co Inc

TREE PLEX—Rome Cable Corp

Trent Inc 201-299 Leverington Ave Phila 27 Pa

TRI-BIT—Arro Expansion Bolt Co

TRI-CLAD—General Electric Co

Tri-Part Mig Co 925 Cherry St

TRI-PHASE—Taylor-Winfield Corp

TRI-PHASE—Taylor-Winfield Corp

TRI-PHASE—Taylor-Winfield Corp

TRI-PHASE—Taylor-Winfield Corp

TRIAD-Nye Tool Co

TRIADRY—Triangle Conduit & Cable Co Inc

Triangle Equipment Co Inc 45 River Ro Nuttley 10

New Jersey

Triangle Instruments Co—see Epoc Electronics Inc

Trico Fuse Mig 2948 N Fifth St Milwaukee 10 Wis Triangle Equipment Co Inc. 45 River Rd. Nutley 10 New Jersey
Triangle Instruments Co—see Epoc Electronics Inc.
Trico Fuse Mfg. 2948 N Fifth St. Milwaukee 10 Wis
TRIEX—Triangle Conduit & Cable Co Inc.
TRIETON TRIES CONTINUE CONTINUE CO Inc.
TRIG—ROSTAL CORPORTION TRIGER CONTINUE CON Trimount Instrument Co 3119 W Lake St Chicago 12 III
Trindl Products Ltd 1807-11 S Clark St Chicago 16 III
Trine Mfg Corp 1430 Ferris PL NY 61 NY o Laboratories Inc 4025 Marrick Road Seaford NY TRION—Chase-Shawmut Co TRIONIC—Chase-Shawmut Co TRIONIC—Chase-Shawmut Co TRIONE—Chase-Shawmut Co TRIONE—Chase-Shawmut Co TRIONE—Chase-Shawmut Co TRIONED—Triangle Conduit & Cable Co Inc TRIOSEAL—Triangle Conduit & Cable Co Inc TRIOSEAL—Triangle Conduit & Cable Co Inc TRIOSEAL—Triangle Conduit & Cable Co Inc TRIP-0-LINK—Kearney (James R) Corp TRIP-S-WER-Kearney (James R) Corp TRIP-S-WER-Kearney (James R) Corp TRIP-LX-TAP—Dossert Mfg Corp TRIPLE-K—Quigley Co Inc TRIPLE-FLO—Benjamin Electric Mfg Co Triple A Battery Co—see Hobbs Battery Co Triplet Electrical Instrument Co 286 Harmon Rd Bluffton Ohio TRIPLEYE—Chance (A B) Co Blufton Ohio
TRIPLEYE—Chance (A B) Co
TRIPLOC—Pyle-National Co
TRIPLOX—Nemco Electric Co
TRIPOMATIC—Keaney (James R) Corp
Tripp Mfg Co 133 N Jefferson St Chicago 6 III
TRISTEEL—Triangle Conduit & Cable Co Inc
Triton Mfg Co Inc East Haddam Conn
TRIWAY—U S Expansion Bolt Co
TROJAN—Hexacon Electric Co
TROJAN—Hexacon Electric Co
TROJAN—Hexacon Electric Products Co
TROLE-PURONE—Femco Inc
Trombetta Solenoid Corp 329 N Milwaukee St Milwaukee 2 Wis

TROMBOLITE—Amplex Corp
TROPIC-AIRE—Bersted Mfg Div McGraw Electric Co
TROPIC-GLO—Knapp-Monarch Co
TROPICA-S—Micamold Radio Corp
TROUBLE SAVER—Patent Scaffolding Co Inc
TRU-FLANG—American Brass Co
TRU-SET—Ramset Fastening System
TRU-TORK—Nankervis (Geo L) Co
TRU-WHITE—Duro-Test Corp
TRUARC—Capewell Mfg Co
Truco Masonry Drilling Div Wheel Trueing Tool Co
3200-3220 W Davison Ave Detroit 38 Mich
TRUCOLITE—Guth (Edwin F) Company
TRUFLEX—Capewell Mfg Co
TRUMBULLITE—General Electric Co Industrial Power
Components Div Distribution Assemblies Dept
TUBE CUT—Collins Machinery Corp
TUBE CUT—Collins Machinery Corp
TUBE SAW—Collins Machinery Corp
TUBE SAW—Collins Machinery Corp
TUBE SAW—Collins Machinery Corp
TUBE SAW—Collins Machinery Corp
TUBE SESS—Henderson Electric Co
TUBETED—Henderson Electric Co
TUBETED—Electric Tube Products
TUCALL—Edwards Co Inc
TUFFERNELL—Westinghouse Electric Corp
TUFFEX—Everwarm Inc
TUFFEX—Everwarm Inc TUFFEX—Everwarm Inc.
TUFFLEX—Brand (William) & Co Inc
TUFFLEX—Brand (William) & Co Inc
TUG—Mercury Manufacturing Co
TULAMP—General Electric Co
TULITO—Meyer Machine Inc
Tulsa Winch Div Vickers Inc 815 E First St Tulsa
20 Okla TULITO—Meyer Machine Inc
Tulsa Winch Div Vickers Inc
20 Okia
TUMBLIN—Star Expansion Bolt Co
TUMBLIN—Star Expansion
TUMS—Hykon Mfg Co
TUMBLIN—Star Expansion
TUMS—Hykon Mfg Co
TUNGRA—General Electric Co
TURBO—Brand (William) & Co Inc
TURBO-DWRESSORS—Spencer Turbine Co
TURBO—Brand (William) & Co Inc
TURBOLENE—Brand (William) & Co Inc
TURBOLENE—Brand (William) & Co Inc
TURBOTEMP—Brand (William) & Co Inc
TURO-SOLV—Turco Products Inc
TURN-TYTE—Rodale Mfg Co Inc
TURN-TYTE—Rodale Mfg Co Inc
TURN-TYTE—Rodale Mfg Co Inc
TURN-TYTE—Rodale Mfg Co
TURNLOX—Benjamin Electric Mfg Co
TURNLOX—Benjamin Electric Mfg Co
TWIN-LUG—Blackburn (Jasper) Corp
TWIN EXCE—Other—Brand Metal Hose Co
TWIST-INC—Hobet Mfg Corp
TWINST-INC—Universal Metal Hose Co
TWIST-INC—Universal Metal Hose Co
TWIST-LOCK—Hubbell (Harvey) Inc
TWIST-ROCK—P-W Industries Inc
TWIST-ROCK—P-W tery Co
TYNISWITCH—Detroit Controls Div u

U-BLADE—Leviton Mfg Co Inc
U-C-Lite Manufacturing Co 1050 West Hubbard St
Chicago 22 Hillinois
U-LINE—Hillumitronic Engineering
U-RAD—Wiegand (Edwin L) Co
U S—see United States
USCO Power Equipment Corp 829 N 36th Way
Birmingham 4 Ala
U.S.E.—U S Expansion Bolk Co
USG—U S Gauge Div American Machine & Metals Inc
USG—United States Graphite Co
USMC—United Chromium Inc
UFLEX—Hatfield Wire and Cable Div Continental
Copper & Steel Indus Inc
UIANE—United Chromium Inc
UIANE—Garey Linds Inc
UIANE—WEST Steel Indus Inc
UIANG-UIX—Garey Lighting Div
UITRA-LITE—Revere Electric Corp
ULTRA-LUX—Garey Lighting Div
UITRA-VIOLE—Plastoid Corp
ULTRALUME—Westinghouse Electric Corp
ULTRAVERTER—Blonder-Tongue Laboratories Inc
Unadco Mfr Co—see United Mfg Co
UNAFLOW—Skinner Engine Company
Ungar Electric Tools Inc 4101 Redwood Ave Los
Angeles 66 Calif
UNI-BALLAST—Line Material Industries
UNI-BALLAST—Line Material Industries
UNI-BUS—Electric Distribution Products Inc

Union Carbide Corp Silicones Div 30 E 42 St New York 17 NY
Union Insulating Co Box 351 Parkersburg West Virginia
Union Metal Mfg Co 1432 Maple Ave Canton 5 Ohio
UNIPAK—Sprague Electric Co
UNISEAL—Franklin Electric Co Inc
UNISEAL—Johns-Manville
UNISHEAR—Stanley Electric Tools
UNISPEED—Stromberg Time Corp
Unistry Products Co 933 Washington Bivd Chicapa
711 UNIT BREAKER—Cutler-Hammer Inc UNIT-VERSAL—BullDog Electric Products Co UNITAIRE—Westinghouse Electric Corp Sturtevant Div
UNITAP—Dossert Mfg Corp
UNITEA-LITE—Moe-Bridges Corp
UNITEA-LITE—Moe-Bridges Corp
United Componium—see Metal & Thermit Corp
United Cinephone Corp—see Ripley Co Inc
United Electric Montrols Co 85 Schools St Watertown 72 Massachusetts
United Electric Machinery Co 1824E N 72 Ct Elmmood Park III
United Electric Motor Co 178 Centre St New York
13 New York United Mrg Co 41 Haig St Hamden 14 Conn United Pressed Products Co 900 5 Despialnes St Chicago 7 III United States Air Conditioning Corp P 0 Box 360 Delaware Ohio U S Electrical Motors Inc Los Angeles 54 California United States Electrical Tool Co 3640 Llewellyn St Cincinnati Ohio United States Electronics Corp 275 Warren St Lyndhurst NJ hurst NJ.

U. S. Expansion Bolt Co State St & Pennsylvania
Railroad York Pennsylvania
U. S. Gauge Div American Machine & Metals Inc
Clymer Ave Sellersville Pa
United States Graphite Co 1621 Holland Ave Sag-United States Graphice Of Joseph Organia Mile.

U. S. JUNIOR—Trine Mfg Corp
U S KEM-BLO—United States Rubber Co
U S Motors—see U S Electrical Motors Inc
United States Motors Corp 420 Nebraska St Oshkosh United States Petroleum Co 104 Lakeview Ave United States Petroleum Co 104 Lakeview Ave Clifton NJ U S PEERLESS—United States Rubber Co United States Rubber Co United States Rubber Co United States Rubber Co Mechanical Goods Div 1230 Avenue of the Americas New York 20 NY U.S. SENIOR—Trine Mitg Corp United Transformer Co 150 Varick St. New York 13 NY
UNITIZED—Magnatran Inc
UNITOP—Allis-Chalmers Manufacturing Co
UNITRANE—Trane Company
UNITRIP—Stromberg Time Corp
UNITRON—1-T-E Circuit Breaker Co
UNITRON—1-T-E Circuit Breaker Co
UNITYRES-Superior Appliance Co
UNIVERSAL—Mosfield Mfg Co
UNIVERSAL—Mueller Electric Co
UNIVERSAL—Mueller Electric Co
UNIVERSAL—Pittsburgh Reflector
UNIVERSAL—Pittsburgh Reflector
UNIVERSAL—Pittsburgh Reflector
UNIVERSAL—Pittsburgh Reflector
UNIVERSAL—Burghar Electric Co
UNIVERSAL—Topped Reflector
UNIVERSAL—Topped Reflector
UNIVERSAL—Topped Reflector
UNIVERSAL—Burghar Electric Co
UNIVERSAL—Bu Universal Electric Co 300 East Main St Owosso Michigan Universal Electric Sales Corp 3537 Lee Rd Cleveland 20 Ohio Universal Mfg Corp 29-51 E 6th St Paterson NJ Universal Metal Hose Co 2157 S Kedzie Ave Chicago 23 III Universal Motor Co 438 Universal Dr Oshkosh Wis Universal Power Corp—see Universal Electric Sales Universal Velder Corp—see Atlas E-E Corp
Universal Welder Corp—see Universal Electric Sales Corp Universal Winding Co P 0 Box 1605 Providence 1 Rhode Island UP-N-DOWN—Farles Lamp Div General Lamps Mfg UP-N-DOWN—raries Lamp UP-COPP.
Corp
Corp
Up-Right Inc Up-Right Scaffolds Div 1013 Pardee
St Berkeley 10 Calif
UPLIFTER—Revolvator Company
UPPCO—United Pressed Products Co
Uptegraff (R E) Mfg Co P 0 Box 182 Scottdale Pa
URBAN LITE—Revere Electric Mfg Co
way Chicago 40 III
Instit Inc. 41 Main St Bradford Pa

URNA—Curtis Lighting Inc
U. S.—see United States
USAIRCO—United States
USAIRCO—United States Air Conditioning Corp
USAIRTE—United States Electric Mfg Corp
Utica Drop Forge & Tool Orp—see Utica Drop Forge
& Tool Div
Utica Drop Forge & Tool Div Kelsey-Hayes Co Utica
4 NY
UTIL-A-TOOL—Templeton Kenly & Co
UTIL-A-VENT—General Blower Co
UTIL-A-VENT—General Blower Co
UTILLSCOPE—Diamond Power Specialty Corp
UTILISCOPE—Diamond Power Specialty Corp
UTILISCOPE—Diamond Power Specialty Corp
UTILITY—Steber Mfg Co
Utilities Safety Supply Co Inc Jefferson St & Highway
50 Lee's Summit Mo
Utilities Service Co I Pine St Allentown Pa
UTILITY—Black & Decker Mfg Co
Utility Service Co Inc 1620 13th St (P 0 Box 102)
Racine Wis
Utility Transformer and Equipment Co 702 Lynn Ave
Baraboo Wis
UTILIVUE—Diamond Power Specialty Corp
UVILUX—Butron Mfg Co

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V-BEAM—Duro-Test Corp
V-C-U—Guth (Edwin F) Co
V & S—Reliance Electric & Engineering Co
V V. Fittings Co 711 Cherry St. Phila 6 Pa
VAC-IT—Doyle Vacuum Cleaner Co
VAC-KING—American Floor Machine Co
VAC-ON—Hypro Engineering Inc
VAC-U-SEL—General Electric Co
Vaco Products Co 317 E Ontario St. Chicago 11 III
VACU-BREAK—BuilDog Electric Products Co
Vacuum Tube Products Co Inc 2020 Short St. Oceanside Calif
VALIMITOM—Electric Controller & Mfg Co side Calif
VALIMITOR—Electric Controller & Mfg Co
Valiey Fan Mfg Co Box 206 Fort Valley Ga
VALV-AMP—General Electric Co
VALVETROL—Jordan Co Inc.
Van Cleef Bros Inc—see Dutch Brand Div
Van Cleef Div Johns Manville Co—see Dutch Brand
Div Van Dorn Electric Tool Co-see Black & Decker Mfg Co
Van Dyke Div—see Faries Lamp Div General Lamps
Mfg Corp
Van Dyke Industries—see Faries Lamp Div General
Lamps Mfg Corp
VANO—Coppus Engineering Corp
VANO—Coppus Engineering Corp
VAPORTITE—Ideal-Simplet Fittings Inc
VAPORTITE—Office Inc
VAPORTEMP—Blue M Electric Co
VAPORMASTER—Crouse-Hinds Co
VAPORMASTER—Crouse-Hinds Co
VAPROTEX—Woodhead (Daniel) Co
VARBAND—Varies Corp
VAREX—Ohio Brass Co VAPROTEX—Woodhead (Daniel) Co
VARBAND—Varfex Corp
VARBAND—Varfex Corp
VARFIT—Varfex Corp
Varfex Corp 508 W Court St Rome
Varfex Corp 508 W Court St Rome
Varfex Sales Co Inc—see Varfex Corp
VARFLO—Varfex Corp
VARFLO—Varfex Corp
VARI-AMP—Ailis-Chalmers Mfg Co
VARI-AMP—Ailis-Chalmers Mfg Co
VARI-AMP—Curis Lighting Inc
VARI-SPOT—Curis Lighting Inc
VARI-SUPPE —Us Electric Co
VARI-SUPPE—U S Electrical Motors Inc
VARI-SPOT—Us SIMPSON Electric Mfg
VARI-SPOT—US Electrical Motors Inc
VARI-STAT—Ward Leonard Electric Co
VARSITY—Benjamin Electric Co
VARSITY—Benjamin Electric Mfg
Co
VARSITY—Sensant SI
VALIT-MASTER—Haertel (Walter) Cu
VECTAIRE—Preway Inc VARVITALS Veeder-Root Inc
VAULTMASTER—Hertel (Waiter) CU
VECTAIRE—Freway Inc.
Veeder-Root Inc. 70 Sargeant St Hartford 2 Conn
VEEDRUM—Art Metal Co
Velocity Power Tool Co 201 N Braddock Ave Pittsburgh 8 Page 1 Strain Laboratories Inc.
Velotron Inc. 1166 Broadway New York 1 NY
VELVALUME—Day-Brite Lighting Inc.
Venaline Products Co P 0 Box 222 Hawthorne NJ
VENTAL—Coppus Engineering Corp
VENTILER—Active Specialty Corp
VENTURA—American Blower Corp
VENTURA—American Blower Corp
VENTURA—American Blower Corp
VENT-BLA—Active Specialty Corp
VERTAL—Active Specialty Corp
VERTALS—Sorger (M. L) & Son Inc.
VERTALS—Sorger (M. L) & Son Inc.
VERTALS—Singder (M. L) & Son Inc.
VERTALS—Singder (M. L) & Son Inc.
VERTALS—Use Instrument Corp
VERSA—USe-Sorger (Strain Company
VERSA—US-Can Company
VERSA—INCA—Control Lighting Inc.
Versabar Corp 14 Whyte St Jersey City NJ
Versabar Diw M-H Standard Co—see Versabar Corp
VERSATIL—Versen (Kurt) Company
VERSATINE—Peek & Harvey Mfg Corp
VERSATRO—Assembly Products Inc
VERSATRO—Versen (Kurt) Company
VERSATRO—Versen (Kurt) Company
VERSATIVE—Versen (KURT) Company VERSALU-Versen (Kurt) Co 4 Slocum Ave Englewood NJ VERSIL-Versen (Kurt) Company VERSILER-Keystone Electric Mfg Co VERSITAP-Burndy Corp

VERSTRUM—Versen (Kurt) Co
VERTICON—Art Metal Co
VERTICON—Art Metal Co
VERSOLINE—Miller Co
VERSOLINE—Miller Co
VERTOLITE—Line Material Industries
VI-TITE—Penn-Union Electric Corp
VIBRA-FLOW—Syntron Co
VICON—Insul-G-Corp
VICORAY—Whitaker (Douglas C) Co Inc
Victor Electric Wire & Cable Corp 618 Main St
Victor Instrument Mig Co Inc 33 W 60 St NY 23
NY
Victor Insulators Div I—T—E Circuit Panales Co Victor Victor Insulators Div I-T-E Circuit Breaker Co Victor Victor Insulators Inc-see Victor Insulators Div VICTOR JR.—Trine Mfg Corp
VICTOR JR.—Trine Mfg Corp
VICTOR SR.—Trine Mfg Corp
VICTOR SR.—Trine Mfg Corp
VICTOR SR.—Trine Mfg Corp
VICTOR Ventilator Co—see Victor Ventilator Div
Victor Ventilator Div Philip Carey Mfg Co Middle-Victor Ventilator over the control Co VIKING—Mid-States Welder Mfg Co VIKING—Mid-States Welder Sales Co VIKING—Progressive Welder Sales Co VIKING—Products 5601 Walworth Ave Cleveland VIGILTROL—Automatic Control Co
VIKING—Mid-States Welder Mfg Co
VIKING—Mid-States Welder Mfg Co
VIKING—Progressive Welder Sales Co
Viking Air Products 5601 Walworth Ave Cleveland
2 Ohio
Viking Instruments Inc East Haddam Conn
VIMCOLIGHTS—Vimco Mfg Co Inc
VIMCOLIGHTS—Vimco Mfg Co Inc
VINSOL—Rusgreen Mfg Co
Virden (John C) Co 5009-6103 Longfellow Ave
Cleveland 3 Ohio
VIS-A-RAY—Dura-Test Corp
VIS-O-MATIC—Co-Operative Utilities Co Inc
VISA-WALT—Advance Transformer Co
VISA-FLAME—Mercold Corp
VISI-GARD—Guyan Machinery Co Inc
VISICALL—Sperti Faraday Inc
VISION-AIRO—Guyan Machinery Co Inc
VISICALL—Sperti Faraday Inc
VISION-AIRE—Subbeam Lighting Inc
VISIONAIRE—Silvray Lighting Inc
VISIONAIRE—Silvray Lighting Inc
VISIONAIRE—Silvray Lighting Inc
VISULARM—Crouse-Hinds Co
VITALITE—Magni Flood Inc
VISULARM—Crouse-Hinds Co
VITALITE—Sublem American Fused Quartx Co
VITROTALLOY—Billings & Spencer Co
VITROTALLOY—Billings & Spencer Co
VITROTALLOY—Billings & Spencer Co
VITROTALLOY—Billings & Spencer Co
VITROTALOY—Billings & Spencer Co
VITROT

w

WB—Ware Fuse Corp
W.G.R.—Roller (Wm G) Inc
W. & T.—Wallace & Tiernan Inc
WW—Western Wire Products Co
Wange Electric Inc 720 Colfax Ave Kenilworth New
Jersey
Wac Engineering Co—see Wac Line Inc
Wac Line Inc 35 S St Clair St Dayton 2 Ohio
WAC-TAC—Wac Line Inc
Wachs (E H) Co 1525 N Dayton St Chicago 22 III
WACLINE—Wac Engineering Co
Waco Manufacturing Co 3565 Woodale Ave Minneapolis 16 Minnesota
Wadsworth Electric Mfg Co Inc 20-34 W 11th St
(Box 272) Covington Ky
WAGEMSELLER—Acme Mfg & Gasket Co
Wagner Electric Corp 6400 Plymouth Ave St Louis
14 Missouri
Wagner Malleable Products Co 222 West Adams St
Cleveland 6 Illinois
WAHLQUIST—Misson Electrical Laboratory Inc
Wahlund (M Paul) Mechanical Laboratory P O Box
16 Grant Iowa
Wakefield Co 731 S Water St Vermillon Ohlo
Wakefield Brass Co—see Wakefield Co
Walcon Electric Co 131 Blackstone St Providence 1.
RI

Walco Industries Inc.—see Progressive Machine Works WALDEN—Stevens Walden Inc. Waldman (John J) 20 Warren St New York 7 NY Walker Brothers End St. Conshohocken Pa Walker Div Norma-Hoffmann Bearings Corp Stamford Con
WALKERPLEX—Walker Brothers
WALKERFLEX—Walker Brothers
WALKERIZED—Walker Brothers
WALKERZED—Walker Brothers
WALKERSYN—Walker Brothers
WALKERSYN—Walker Brothers
WALKERSYN—Walker Brothers
WALKIZE—WorkLIFTER—Economy Engineering Co
Walkirt Co 141 W Hazel St Inglewood 3 Calif
WALL LINE—Trane Co
WALL LINE—Trane Co
WALL-AIRE—Fresh'nd-Aire Div Cory Corp
WALL-AIRE—Fresh'nd-Aire Div Cory Corp
WALL-FIN—Trane Co
WALLE-FIN—Trane Co
WALLUM-Trane Fixension
WALLUM-Trane—Gruber Bros Inc
WALLUM-Wali (P) Mfg Co
Walser Automatic Timer Corp
New York 17
NY
Walton Laboratories Inc 1186 Grove St Irvington
11 NJ
Wama Co Industrial Bldg Baltimore 2 Md WALKERDUCT-Walker Brothers New York Award Care State Of the Care State Of t Vernon NY
Ware Bros—see Ware Fuse Corp
Ware Fuse Corp 4400 W Lake St Chicago 24 III
WAREHOUSER—Yale Materials Handling Div
Warren Lamp Co—see Solar Electric Corp
Warrick (Chas, F) Co. 1964 W Eleven Mile Rd
Warrick (Chas, F) Co. 1964 W Eleven Mile Rd Warren Lamp Co—see Solar Electric Corp
Warrick (Chas F) Co 1964 W Eleven Mile Rd
Berkley Mich
WARWICK—Hayden Twist Drill Co
Washington Aluminum Co Inc Knecht Ave & Pennsylvania RR
WASTE CHAMP—Collins Machinery Corp
WATCH CASE—Westinghouse Electric Corp
WATCH DOG—General Electric Co Construction
Materials Div
WATCHMASTER—Carpenter Mfg Co
WATER BUOY—Kneisley Electric Co
Water Level Controls Co—see Healy-Ruff Co Water
Level Controls Div
Waterman Products Co Inc 2445-63 Emeraid St
Phila 25 Pa
WATERTITE—Woodhead (Daniel) Co
Water Electric Mfg Co 1376 Ferguson Ave St Louis
14 Mfg Co 1876 SW Lake Rd Packer River 16 Watteredge Co 19629 W Lake Rd Rocky River 16 WATTSAVER—Perfection Industries Div Hupp Corp Waukesha Motor Co Waukesha Wis Waweland Electric Co 5542 N Ashland Ave Chicago WEATHER-CHRON—Automatic Devices Co Inc
WEATHER DUTY—Westinghouse Electric Corp
WEATHER-HO—Automatic Devices Co Inc
WEATHER-HO—Automatic Devices Co Inc
WEATHER-MAN—Automatic Devices Co Inc
WEATHER-MAN—Automatic Devices Co Inc
WEATHERHO—Continental Electric Equipment Co
WEATHERMANER—Carrier Corp
WEATHERMASTER—Carrier Corp
WEATHERMASTER—Steber Mfg Co
WEATHERMASTER—Steber Mfg Co
WEATHERMASTER—Steber Mfg Co
WEATHERMASTER—STED Electric Corp
WEATHERMASTER—STED Electric Corp
WEATHERMASTER—STED ELECTRIC CO
WEATHERMEND—General Electric Corp
Webster Electric Mfg Co 1701 S W Jefferson St Portland 1 Ore
Webster Electric Corp 1900 Clark St Racine Wis Webs Electric Mg Co 1701 S W Jefferson St Portland 1 Ore
Webs Electric Co 1900 Clark St Racine Wis
WEDGE-RITE—Kearney (James R) Corp
WEDGE-RITE—Kearney (James R) Corp
WEDGE-RITE—Kearney (James R) Corp
WEDGE-RITE—Kearney (James R) Corp
WEDGE-RITE—Merican Pulley Co
WEDGE-RITE—American Pulley Co
WEDGETITE—Crouse-Hinds Corp
WEDGETITE—Crouse-Hinds Corp
WEDGETITE—Insulation Manufacturers Corp
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WEDGETITE—Crouse-Hinds Corp
WEDGETITE—Crouse-Hinds Corp
WEWED KUTTER—International Electric Fence Co Inc
Weiss & Bibelley Merchandise Corp 584 Broadway
New York 12 New York
WEJ-II—Kirel Inc
Welster Instrument Corp 195 E. Merrick Rd Freeport II NY
Weksler Thermometer Corp—see Weksler Instrument Corp Welbilt Corp 57-18 Flushing Ave Maspeth 78 LI NY
Welch Mfg Co—see Raydyne Corp
WELD-ARC—Alloy Rods Co
WELDOX—Hardman (H V) Co Inc
WELDPOWER—Raytheon Mfg Co
Weller Electric Corp 601 Stone's Crossing Rd Easton Pa
Weller Mfg Co—see Weller Electric Corp
Wellington Machine Co 133 De Wolf St Wellington Wells Mfg Corp 250 Service Rd Three Rivers Mich WELTRONARC—Weltronic Co Weltronic Co 19500 W Eight Mile Rd Detroit 41 Wen Products Inc 5808 Northwest Highway Chicago 31 III WESCO-Westinghouse Electric Supply Co Weslx Inc-see Wesix Electric Heater Co Wesix Electric Heater Co 390 First St San Francisco 5 California West Instrument Corp 4363 W Montrose Ave Chicago 41 cago 41 III
West Wind Corp 1800 Airport Way Seattle 4 Wash
Westchester Brickote Products Co Inc
bridge Rd Bronx 61 New York

Western Electro-Mechanical Co Inc 300 Broadway Oakland 7 Calif

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Western Gear Corp Electro Products Div 132 W
Colorado St Pasadena 1 Calif
Western Insulated Wire Co
Angeles 58 California
WestInghouse Electric Corp P 0 Box 868 Pittsburgh Pa 30 Pa
Westinghouse Electric Corp Lamp DIv Bloomfield
New Jersey
Westinghouse Electric Corp Lighting Div 1216 W
58th (P 0 Drawer 5817) Cleveland 1 Ohio
Westinghouse Electric Corp Standard Control Div
Beaver Pa
Westinghouse Electric Corp Sturtevant Div Damon
St. Hyde Park Boston 36 Massachusetts
Westinghouse Electric Supply Co 3 Gateway Center
Pittsburgh 30 Pa
Western Products Div Western Lithograph Co 600
E Second St. Los Angeles 54 Calif
WESTMINSTER—Edwards Company Inc
WESTMORELAND METAL MFG CO Milnor St. &
Bleigh Ave Phila 35 Pa
WESTON—Round (David) & Son Inc
Weston Electrical Instrument Corp—see Weston Instruments use Electric Corp Lamp Div Bloomfield Westingh ments
Weston Instruments Div of Daystrom Inc 614 Freiinghuysen Ave Newark 5 NJ
WETOIL—Farrelloy Co
WEYCO—Young Electric & Mfg Co Inc
WHEATH—Koehler Manufacturing Co
Wheat Laboratories—see Koehler Mfg Co
WHEEL-ABOUT—Rich Fan Mfg Co Inc
Wheel Trueing Tool Co—see Truco Masonry Drilling
Div Wheeler Electronic Corp 150 E Aurora St Waterbury 20 Conp 20 Conp seeler Insulated Wire Co-see Wheeler Electronic Wheeler Reflector Co 275 Congress St Boston 10 Massachusetts Wheelock Signals Inc Branchport Ave Long Branch White-Rodgers Co 102 Pershing St. Louis D Mite-Rodgers Co White-Rodgers Co 102 Pershing St. (P 0 Box 1318) White-Rodgers Co 102 Pership St. (P 0 Box 1318) Monroe La White CO C) Co 15-21 Hermon St. Worcester 8 Mass White CO C) Co 15-22 Hermon St. Worcester 8 Mass White CO C) Co 15-22 Hermon St. Worcester 8 Mass White CO C) Co 15-22 Hermon St. Worcester 8 Mass White CO C) Co 15-22 Hermon St. Worcester 8 Mass White CO C) Co 15-22 Hermon St. Worcester 8 Mass White CO C) Co 15-22 Hermon St. Worcester 8 Mass White CO C) Co 15-22 Hermon St. Worcester 8 Mass White Rodgers Co 102 Cass Ave St. Louis 6 Mo White-Rodgers Co 102 Co 25-24 White-Rodgers Co Whitman & Barnes Div United Drill and Tool Corp 40600 Plymouth Rd Plymouth Mich Whitney Blake Co 102 Pershing St. New Haven 14 Con N.I Onn
WHIZ—Crown Industrial Products Co
WHIZ—Rockford Wire Stripper Co
WHIZ—Rockford Wire Stripper Co
WIDE-SPRED—Holophane Company Inc
WIDE-SPRED—Holophane Company Inc
WIDE-VUE—SImpson Electric Co
WIDE-WIE-MIN CO 7657 Thomas Blwd Pittshut-8 Phuse Company Wil-Son Mfg Co Cloverport Ky Wilbur & Williams Co 130 Lincoln St Brighton 35 Boston Mass Boston Mass
Wilde Drop Forge and Tool Co—see Wilde Tool Co
Wilde Tool Co Inc Hiawatha Kans
Wilder Manufacturing Co Inc Mechanic St & Erie
Railroad Port Jervis New York
Wiley Displays Inc—see Wiley (R & W) Inc
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NY Wilkoff (M J) Co 823 Locust Pittsburgh 19 Pa Willard Storage Battery Co—see Willard Stora Storage Willard Storage battery Co—see Willard Storage
Battery Div
Willard Storage Battery Div Electric Storage Battery
Co 246-286 E 131 St Cleveland 8 Ohlo
Williams (J H) & Co 400 Vulcan St Buffalo 7 NY
Williams (Hugh B) Mfg Co 8330 Lovett St (P 0 Box
7815) Dallas Tex
Williams (H E) Products Co 106 S Main St Carthage Mo
Wilmington Fibre Specialty Co New Castle Dela
Wilson (G C) & Co 1915 Eighth Ave Huntington Wilson (C O'& Co 1915 Eighth Ave Huntington W Va Wilson (G C) & Co 1915 Eighth Ave Huntington W Va Wilson-Albrecht Co Inc—see Waco Mfg Co Wilson (J A) Lighting & Display Inc 516-17 G Daniel Baldwin Bidg Erie Pa Wilson Rubber Co 1200 Garfield Ave SW Canton 6 Ohio Wincharger Corp E Seventh & Division St Sloux City 2 Iowa WINOD—Wincharger Corp WIND-ELECTRIC—Hirschman-Pohle Co Inc WIND-0-VENT—Reed Unit-Fans Inc WIND-0-VENT—Reed Unit-Fans Inc Wind-Way Fan & Vertilator Co 531 St Joseph St New Orleans 12 La WINDALL—Wange Mfg Co WINDMAKER—Rich (Phil) Fan Manufacturing Co Inc WING-DING—Diamond Expansion Bolt Co Inc WING FOIL—Wing (L J) Mfg Co Wing (L J) Mfg Co Wing (L J) Mfg Co Co Wing (L J) Mfg Co Co Wing Curt's Lighting Inc WINNER—Curtis Lighting Inc Winpower Mfg Co Newton Iowa Winterburn Mfg Co P O Box 386 Putnam Conn WIRE-LESS-COM-Simpson (Mark) Mfg Co Inc LUBE-Ideal Industries Inc WIRE-MIKE—Burndy Corp
WIRE-NUTS—Ideal Industries Inc
WIREDHEAT—Wesix Electric Heater Co WIREDUCT—Wiremold Co WIRELESSFONE—Simpson (Mark) Mfg Co Inc

WIRELESSTALK—Simpson (Mark) Mfg Co Inc WIRELESSTALK—Simpson (Mark) Mfg Co Inc
Wiremold Company Hartford 10 Connecticut
WIREWA—National Electric Products Corp
WIREWATT—Ohmite Mfg Co
WISCO—Wisconsin Storage Battery Co
Wisconsin Carbon Corp—see Kirkwood Carbon Corp
Wisconsin Electric Co—see Dumore Co
Wisconsin Electrical Mfg Co Inc 1237 S Third St
Milwaukee 4 Wis
Wisconsin Storage Battery Co 1222 18th St Racine
Wis Wis
Wodack Electric Tool Corp 4627 West Huron St
Chicago 44 Illinois
WONDABAR—Virden (John C) Co
WONDER LITE—Magni Flood Inc
Wood Specialty Mfg Co—see General Cement. Mfg Co
Woodhead (Daniel) Co 15 N Jefferson St Chicago Woodward Machine Co Lighting Dlv 4833 Elmhurst Detroit 4 Mich Detroit 4 Mich Wooster Div—see Borg-Warner Corp Cleveland Commutator Div WORK BULL.—Massey-Ferguson Industrial Div WORK-O-Lite Co 522 Cortlandt St. Believille 9 NJ WORK-O-Lite Co 522 Cortlandt St. Believille 9 NJ WORKSAVER—Yale Materials Handling Div Yale & Towne Mfg Co Worner Electronic Devices Rankin III Worthington Corp Worthington Ave Harrison NJ WRAP-CAP—Ideal Industries Inc WRAP-TI—HEAT—Acra Electric Corp WRAP-CAP—Ideal Industries Inc WRAP-TI—HEAT—Acra Electric Corp Wrap-on Co 341 W Superior St. Chicago 10 III WRIGHT—Electric Controller & Mfg Co Wright Hoist Div American Chain & Cable Co Inc Franklin & Hay Sts Vork Pa Wrought Washer Mfg Co 2280 South Bay St Milwadsey Wisconsin WYCD—Wyzenbeck & Staff Inc WYTE LINERS—Guth (Edwin F) Co Wyzenbeck & Staff Inc WYTE LINERS—Guth (Edwin F) Co Wyzenbeck & Staff Inc 223 N California Ave Chicago 12 III Wooster Div--see Borg-Warner Corp Cleveland Com-

X

XL—Excel Fuse Company
X-L—Henderson Electric Co
X-Ray Reflector Co—sec Curtis Lighting Inc
X-VAR—Fidelity Chemical Products Corp
XCEL—Xcelite Inc
Thorne Ave at Bank St Orchard Park NY
XDUCT—Mational Electric Products Corp
XELA—Xielin (Mathias) & Sons
XELON—Times Wire & Cable Co
XIT—Iona Ventilator Co Inc
XTENSION DUCT—Mational Electric Products Corp

Y-ER-EAS—Electro Compound Co
YAGER—Benson (Alex R) Co Inc
YAK—Mercury Manufacturing Co
Yale & Towne Mtg Co 11,000 Rooseveit Bivd Philadelphia 15 Pa
YANK—Mercury Manufacturing Co
YANKEE—North Bros Mtg Co
YANKEE—Stanley Tools
YARD LITE—Markel Electric Products Inc
Yardney Electric Corp 40-50 Leonard St New York
13 NY
Yardney International Corp—see Yardney Electric Corp 13 NY

Yardney International Corp—see Yardney Electric Corp

Yardney Laboratories Inc—see Yardney Electric Corp

Yardney Laboratories Inc—see Yardney Electric Corp

Yeats Appliance Dolly Sales Co 2124 North 12th St

Milwaukes 5 Wisconsin

YOLOY—Youngstorn Sheet and Tube Co

York Corp Roosevelt & P R R York Pa

York Ice Machinery Corp—see York Corp

York Mig Co—see York Corp

YORKAIRE—York Corp

Yorkville Metal Products Co 677 Broadway New

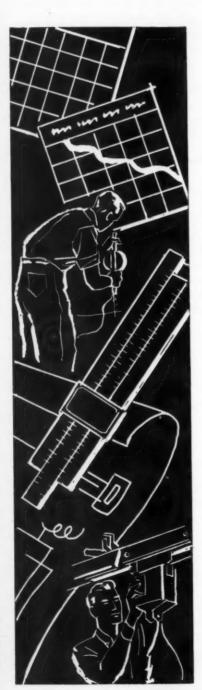
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ZAMPA—Weiss and Biheller Merchandising Corp Zenith Electric Co 155 W Walton St. Chicago 10 III ZEPHAIR—Hunter Fan & Ventilating Co ZEPHR-TROL.—Welbit Stove Company Inc ZEPHYR—Chester Holst Div National Screw & Mfg Co Zernickow (O) Co 15 Park Row New York 38 NY ZINC-SHIELD—Wilbur & Williams Co Zinsco Electrical Products 729 Turner Los Angeles 12 Calif Zinsmeyer Co—see Zinsco Electrical Products ZIP—Mid-States Welder Mfg Co ZIPPUCT—Zippertubing Co Calif ZIPPER-ETTE—Mid-States Welder Mfg Co Zippertubing Co 752 S San Pedro Los Angeles 14 ZIPPWRAP—Zippertubing Co ZIPPWRAP—Zippertubing Co ZIPSOL—Fidelity Chemical Products Corp ZONALARM—Edwards Co Inc ZOREX—Adjustable Fixture Co

PRODUCT SELECTION DATA



Detailed information on electrical products

This section contains data presented by manufacturers of electrical apparatus and supplies, utilization equipment, components, tools and accessories. Descriptions include installation and application data, performance characteristics and specifications.

These advertisements do not necessarily cover all products of manufacturers represented. Companies are listed in the Product Directory under each product they manufacture.

P. Lorillard Company
Powers-Up to produce
100 million cigarettes a day
under one roof

PLord &

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YOU CAN BE SURE ... IF IT'S Westinghouse

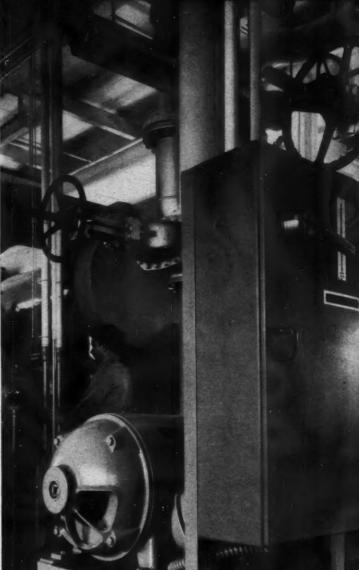
The completely new "electromated" Greensboro, N. C. branch of the P. Lorillard Co. is designed for tomorrow's expansion, both in power and plant layout, as well as for today's immediate production needs. Westinghouse type OV-20 outdoor lighting is used for the building approach and 650-car parking area.

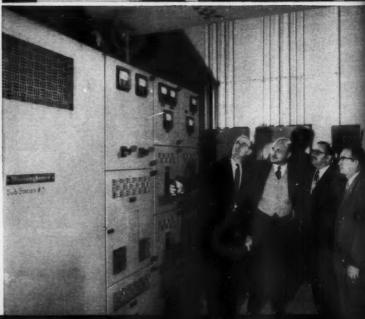
▶ A Westinghouse class 11-404 reducedvoltage starter provides automatic starting and protection for the Westinghouse Life-Line® 60-hp motor. The motor is part of a system which automatically controls the "man-made" climate, so necessary in the cigarette-making industry.

▼ A Lorillard maintenance man inspects the class 11-400 reduced-voltage starter which controls the 200-hp Life-Line air compressor motor supplying air to safeguard instruments. A 400-amp, 600-V, AHF-355 safety switch is shown in the background. On the wall (right) are two Westinghouse class 11-404 reduced-voltage starters providing protection for Westinghouse motors.



▶ O. B. Van Hise, Lorillard Plant Engineer; Wm. Folk, Jr., Westinghouse Sales Engineer; J. E. Guill of Starr Electric Co., Inc., Electrical Contractors and Engineers; H. L. Coble, H. L. Coble Construction Co., General Contractor, examine one of the plant's nine dry-type power centers. Power centers have spare circuit breakers plus blank cubicles equipped for future power needs. Overhead bus duct serves as tie-run between power centers.





Westinghouse electrical equipment used for today's production and tomorrow's expansion

P. Lorillard Company, the nation's oldest tobacco firm, is now occupying the newest and most modern cigarette manufacturing plant in the country. Relying heavily on Westinghouse equipment, the ultra-modern Greensboro, North Carolina plant is electrically powered to expand capacity or to shift emphasis from filters to non-filters (or vice versa) almost overnight.

The plant is unique in the tobacco industry not only in design, but because it represents many departures from standard industry procedure. In some instances, departures were so great that new, complex machinery was designed and built.

Power is transmitted to the completely "electromated" plant at 22,000 volts and stepped down by Westinghouse transformers to 12,500 volts and distributed to nine power centers throughout the plant. These network power centers distribute 480/277 volts and are interconnected to avoid shutdown in the event of a partial power failure.

Lorillard minimized human error and bolstered

production by installing Westinghouse-driven and controlled automatic feeder-conveyors to move the processed tobacco in a steady flow above cigarette-making machines, feed it into the machines and automatically maintain the precise level of tobacco in hoppers. This system assures uniform filling and quality of every cigarette.

In addition to the substation transformers and electrical equipment for the conveyor system, Westinghouse supplied the power centers, motors and controls for the air conditioning system and outdoor lighting for the building approach and plant parking area.

Westinghouse, working with the architect-engineer, general contractor, electrical contractor and Lorillard engineers, had an active part in equipping this plant with the electrical distribution system and with other electrical components required to assure uninterrupted operation and provide for anticipated expansion. Westinghouse can help with

(cont'd

6 Over 250 pages Westinghouse data in Sweet's Construction File

J-94115-3



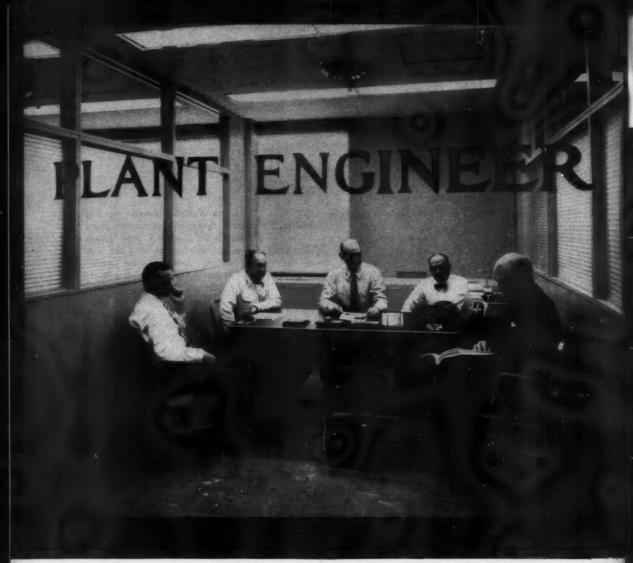
This Life-Line class 11-204 motor starter, with fusible disconnects, which activates the Westinghouse 3-hp Life-Line "A" motor to drive a 75-gpm pump, is located in the mechanical equipment room of the ultra-modern plant.



Westinghouse class 11-204 combination magnetic motor starters with fusible disconnects provide remote control and protection for Life-Line "A" motors located throughout the conveyor system. Equipment is designed to move tobacco from hogshead to finished cigarette without being touched by human hands.



Straight-line feeder-conveyor system continues through automatic cigarette-making, packing, cartoning and shipping. Westinghouse automatic controls, pushbuttons and switches "spot control" the conveyor process.



Specially designed for tomorrow's expansion

any phase of your electrical planning and construction. See your Westinghouse distributor, or write: Westingouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-94115-4

Owner: P. Lorillard Company, New York, N. Y. Architect-Engineers: Lockwood Greene Engineers, Inc.

General Contractor: H. L. Coble Construction Co. Electrical Contractor: Starr Electric Co., Inc. Westinghouse Distributor: Westinghouse Electric Supply Co., Greensboro, N. C.

New complex machinery had to be designed and built by Lorillard to achieve this highly automated plant. J. Berner, Project Engineer, conceived, planned and built much of the special equipment. (Both Berner and R. H. Jobe, Lorillard Draftsman, sport beards in honor of Greensboro's 150th anniversary.)

Wm. Folk, Jr. (right) explains the full line of electrical equipment carried by Westinghouse distributors for immediate delivery. This reduces the inventory Lorillard must carry for replacement needs. Others shown left to right: W. D. Rhea, Power Engineer; M. W. Breitmeier, Plant Maintenance; O. B. Van Hise, Plant Engineer; J. Berner, Project Engineer; all of Lorillard Plant Engineering Section.

Westinghouse



TO TO

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CHROMALOX ELECTRIC HEATING EQUIPMENT

Edwin L. Wiegand Company supplies the electric answer to every heating problem in industry and the home. Over 15,000 standard items are available from the world's largest stock. From these you can select the Chromalox heater best fitted to your needs, or depend on Chromalox to engineer a special heater for your problem.

The application of electric heating equipment can in most cases be made from calculation data that is readily available. In those applications requiring special engineering and manufacture, the nationwide network of Chromalox Direct Factory Representatives is ready to serve you with its broad experience.

Chromalox Element	When to Un	Chaign Favorite	
Strip	Process machines, ovens, drums, dies, platens, pipe- lines, rolls, kettles, tanks, cylinders and nozzles. Air heating, industrial drying, preheating.	Easy to install with clamping bands or standard bolts and heavy duty clamps. Available curved lengthwise or in cross-section. Provides heat where you need it at accurately maintained temperatures. Nickel chromium resistor embedded in refractory which is hydraulically compacted to maximum density and rock-hardness, and enclosed in metal sheath.	Volts: 115, 230, 460 Watts: 100 to 4500 standard ¾", 1", 1½", 2½" widths. Lengths up to 96 inches Terminals, sheath material and auxiliary hardware to accommodate your require- ments
Ring Heaters	Coffee urns and percolators, incubators, brooders, hot plates, melting pots, dies, molds, platens, tanks, kettles.	A conveniently shaped element for both round and square surfaces. Easily installed with standard hardware. Available in single and three-heat models. Larger wattage capacities can be obtained by using combinations of several sizes of ring elements nested inside each other. Same construction as Chromalox strip heaters.	Volts: 120 and 240. Watts: 100 to 1000 standard, Outside diameters: 2½" to 10'15/16". Also available with mounting rivets, with lead wires, and in "dished" construction for convex surfaces.
Heater Bands	Plastics injection and extru- sion barrels and other cylin- drical surfaces.	The Chromalox Heater Band is a pair of half-circle, refractory insulated strip heaters with a new tight-gripping, slip-proof, alloy steel clamping band. Provides accurate unvarying heat at any application. Temperature up to 700° F., and complete, firm coverage at all times. Bands are easy to install, remove or interchange.	Volts: 240. Groups of bands may be connected in 240 or 480 volts, 3-phase. Watts: 750 to 1500 per complete band. Models to fit these diameters: 6",8",9",10½",11½",12½", 13½",14",15½", 17",17½", 20". Available to order for other diameters. Width: 1½".
Cartridge Heaters	For localized heating in work areas requiring close thermal control such as: Dies Platens Molds Extrusion and Injection Barrels	Refractory-imbedded element in straight, accurately finished sheath. Sized to slip smoothly into standard drilled openings. Brass sheath is standard. Inconel sheath available for higher temperatures. Flexible wire leads and bolt-type terminals available. Special devices to protect heater leads against flexing action, abrasion, moisture or vapors.	Diameters: 3/4" to 11%4" Overall lengths: 13/4" to 25%4" Watts: 30 to 2000 Volts: 120 and 240 Special sizes and ratings to order
Straight Tubular Heaters	Ovens, ducts, platens, pipes, tanks or any straight surface requiring heat; space heaters, broilers, rotisseries, warming cabinets, etc.	Triangular cross-section for maximum heat transfer in air or when clamped to straight surfaces. Either triangular or round for insertion in drilled holes or machined grooves in platens, dies, etc. Terminals: bolt type, quick connect, lead wires. Special seals for temperature to 900° F.	Diameters: Triangular: ¾", ½" Round: .188", .250", .330", .440" Overall lengths:
Farmed Tubelar Manters	Extrusion and injection noz- zles, platens, dies, fry kettles, griddles, immersion heaters (with fittings), etc.	Forming adapts tubular elements to limitless configurations and permits maximum heat transfer in small areas.	6" to 30 ft. Watts: 100 to 20,000 watts. Volts: 120, 240, 480.
Flestily [©] and Microfia [©] Elements	Forced air ducts, blower units, ovens, dryers	Finstrip and Microfin heaters offer additional element surface for fast conduction of generated heat to air blast. Both can be formed to concentrate heat. Microfins, because of their slim diameters, offer faster heatup and responsiveness where important. Available in 750° and 950° F. construction.	Finstrips: 120 and 240 volts. 250 to 4150 watts. Finned lengths: 6¼" to 37¼". Microfins: 120, 240 and 480 volts. 475 to 3950 watts. Finned lengths: 7½" to 49½".

CHROMALOX ELECTRIC HEATING EQUIPMENT

Packaged Chromalox Heaters	Where to Uso	their feature	
District the second sec	Dons, ainaii cleaning tanks, tinn-	Chromalox tubular elements of steel, stainless steel, copper or alloy construction are bent to hairpin shape, then welded or brazed to junction box. Liquid tight, steel junction box is coated with heat and acid resistant paint. Sludge legs available at extra cost for easy on-the-job installation.	120, 240, 480 volts single and three phase 550 volts single phase only 2 to 18 kw. 20 and 40 watts/sq. inch Steel construction for heating oil—18 watts/sq. inch Lead construction for heating corrosive water solutions—40 watts/sq. inch
Paragraph of the state of the s	Same applications as over-the- side heaters and also for heat transfer fluids, superheating steam and compressed air.	Flanged models: Copper, steel or alloy sheathed tubular elements are welded or silver-brazed in heavy steel flanges, primary service pressure rated at 150 or 300 lbs. psi. Screw-plug models: Copper sheaths brazed in heavy brass screw plugs, steel sheaths welded in forged steel screw plugs, alloy sheaths welded in alloy screw plugs.	Sheaths: Copper, steel, alloy Flanges: 2", 2½", 3", 5", 6" and Volts: 240, 480, 550, 1 or 3 phase Wattages: 3 to 50 kw. Screw-plugs: ½", ¾", 1", 1½ 2", 2½" standard pipe thread. Volts: 240, 480, 550, 1 or 3 phase Wattages: .1 to 50 kw. Special sizes made to order
	For easy mounting through side walls of pipes and tanks Type ARMT—water Type ARMTO—oil	Heaters are screw-plug type and have built-in thermostat. Type ARMT has temperature range from 50° to 250° F. Heater is constructed of copper and brass with silver soldered joints. Type ARMTO has temperature range from 150° to 550° F. Heater is constructed of steel with welded joints.	Both heaters equipped with standard 2" or 2½" pipe thread screw-plugs 120 and 240 volts single and three phase 1.5 to 9 kw.
	For accurately controlled heating of water, oils, heat transfer media, steam, air or other gases, heating rinse water, steam accumulators, process kettles, shower and washrooms, preheating fuel oil.	A complete heat package with built-in elements; rugged, corrosion-resistant, steel pipe heating chamber; full insulation; heavy gauge steel jacket; thermostat and two sturdy mounting lugs and pipe connections. Explosion- and moisture-resistant terminal covers for special conditions.	Water: I to 100 kw. Oils: 1½ to 40 kw. Dowtherm, Aroclor, Prestone: 1½ to 40 kw. Steam, air and other gases: I to 40 kw. Most sizes available from stock in either 230 or 460 volts, single or three phase Special sizes to order
	Annealing Calendering Curing, Conveyorized Drape forming Drying silk screening Drying and preheating granules Drying and curing plastic loaded glass mat Drying reinforced plastic preforms Embossing Forming and shaping Fusing of cast films and sheets	The Metaray® lamp replacement element is an adaptation of the metal-sheath Far-infrared heater. It is designed to replace glass-enclosed lamps in all types of lamp-bank installations. Provides more uniform work coverage because the heat source is not localized in a small, hot filament, but is dispersed in a large figure 8 pattern providing more uniform heat on the work. Withstands thermal shocks from splashed liquids and other rough usage.	G-30 lamp equivalents: 375 watts, screw base 500 watts, screw base Screw base: R-40 lamp equivalents; 375 watts for double wall ovens; 375 and 500 watts with built-in reflector T-40 lamp equivalents: 600 watts, bi-post base; 1200 watts, bi- post base
Railari Huntari daph stoned Type RAD; double stoned Type U-RAD;	Heat sealing Ink drying, Paint drying Laminating Planishing & polishing Postforming Slush molding Transfer molding Resin curing & finishing Setting paper coating Vacuum forming	Radiation is in a straight uniform band, ideal for heating large areas. Heat source is a tubular element mounted in an extruded aluminum base with a polished aluminum reflector. Element is mounted on secondary insulating bushings. Housing is equipped with two removable sliding mounting clamps which provide flexibility in mounting under a variety of conditions. Type RAD has single straight element. U-RAD elements are hairpin-shaped giving double intensity per lineal inch.	Heated lengths: 16½" to 78" Watts: 600 to 3600 Volts: 120, 240, 480 Special models up to 30 feet Hermetically sealed units for contaminated at mospheres, also moisture-proof models
Form Die Name	for core drying, heat treating and	Alloy-sheathed tubular elements mounted in a steel flange complete with mounting holes. Wiring terminals located outside the heat zone are of alloy construction and enclosed in steel housing. The entire heater or various sections may be energized at one time. Individual heating elements may be replaced.	Fabricated to order 240, 480 volts single or three phase 6 to 60 elements Recommended for operating temperatures to 1050°F. and air velocity of 6 ft./sec.

CHROMALOX ELECTRIC HEATING EQUIPMENT

	Chromalox Element	Where to Ute	Dialija Featuris	Size—Anlings
ch leating leating ions—	H-Two	Pipes, vats or irregular surfaces, fuel oil, elec- troplating, dies and molds, pipelines, valves.	Hi-temp Thermwire consists of a loop of high quality nichrome resistor covered with a thick uniform layer of heat resisting silicone rubber. Provides high dielectric strength and resistance to moisture, abrasion and corrosion.	120/240 volts AC Operating temperatures up to 275°F. Thermostats and input controllers for com- plete automatic con- trol
i, alloy ', 6" and I ", 1", 1% thread. I	Thornwish Heating Cable Thermsish Heating Tops	ing in cold frames, roof eaves and gutters, con- crete slab floors, asphalt and concrete driveways,	Chromalox Thermwire Cable consists of a loop of nichrome heating wire covered with a thick, durable sheath of Neoprene, attached by a waterproof connection to a 10-foot cold lead wire and plug. Chromalox Thermwire Tape consists of a fuse-type alloy wire. If tape is damaged, and heat cannot dissipate, the wire fuses, causing the circuit to open.	110/120 volts AC or DC Cable loop for 110 volt service is 80 feet; for 220/240 volt service, 160 feet. Tape is ½" wide and 20 feet long for use on 120 volt AC or DC circuits Thermostats for completely automatic control
d with " pipe	Slave Ty Onk Honor	For larger areas requiring greater amounts of heat distribution. Suitable for factories, garages, machine shops, and drying rooms.	Twin centrifugal fans draw air across bank of finstrip heaters. Air deflectors discharge warm air downward. Inlet and outlet openings are adaptable to ductwork. Removable panel provides easy access to wiring and blower. Blower can be used with separate circuit for summer cooling. Thermal cutout provides protection against overheating. Manual reset switch.	240 and 480 volts three phase, 60 cycles only 15—40 kw.
e from or 460 e phase	In-dect Type Heater	For mounting in ducts, where air is heated under forced circulation: Ovens Dryers Space heating Process work requiring heated air blasts	Heater consists of banks of finstrip elements mounted side by side in a steel frame. Finstrips are mounted with edges toward the direction of air flow. Mounting holes provided on both sides. Terminals on either bottom or side. Removable terminal covers available.	120, 208, 240, 480 volts single or three phase 6 to 100 kw.
e e p s ;; h	Forced and Duct Heater	Air-conditioning systems Ovens Dryers Air-heating systems—blower or convection type	Long life strip heaters with fins for greater radiating surface. Steel mounting flange for easy, economical installation. Either 2 or 3 elements. Iron, Chrome-steel or Monel sheath.	115 and 230 volts 300 to 4500 watts 6½ to 33% inches overall length. Special ratings on request.
ed o ls	(4)	Skillets Percolators Dutch ovens Fry pans Griddles Charcoal lighters Evaporators Hair dryers etc.	Accurately formed for precision casting and brazing. Available in aluminum, steel, Incoloy and copper-coated steel sheaths.	118, 208, 236 volts. Wattages and shapes to suit customer's design requirements.
p- es ir	Potisse Enne	Rotisseries Barbecues	Designed to meet any specifications.	As required.

HROMALOX PRE-FAB WOVEN, LAMINATED AND MOLDED HEATING ELEMEN

Chromaiox Element	Where to the	Dealys Features	Siero—Matings
Pre-Fr West	for aircraft, rockets and	Flexible, lightweight, dimensionally thin, easily mounted mechanically or with adhesives. Cold sections may be located wherever required to facilitate mounting and to place heat only where needed. Leads can be hot or cold, and may come out at either end of opposite ends, either side of opposite sides, or opposite ends.	Widths: %" to 24". Lengths: In any length; usually multiple circuits in lengths of over 4 feet. Shapes: Any shape within above limits. Voltages: 6 to 240, and 440 for special applications. Wattages: Fractional to 15 watts per square inch.
Pro-Fit Wove Hasters Cast-	other application— Radomes Radar feed systems	Heater becomes part of customer's unit such as a case or end cap. Cold lead wires with any standard terminals are then connected as with any other electrical component. Available in epoxy and Fiberglas filled, polyester and Fiberglas filled, silicone resin and Fiberglas filled. These materials will withstand temperatures from —10° F. to 350° F.	Volts: Same as above. Watts: Fractional to 5 watts per square inch. Sizes and shapes of cast-in woven elements (see above) are limited only to practical mold design for the materials listed under Design Features.
Pro-Fi Heater Lamins	Electronic components	These thin, lightweight elements, laminated in silicone rubber and Fiberglas, can be bonded to most surfaces and shapes. They are moisture-resistant. Temperature range in which they may be used is—100 to 350° F.	Up to 24" x 24". Volts: 6 to 240, 440 for special applications. Watts: Fractional to 15 watts per sq. in., higher if takeaway rate is suitable. Thickness: .020" to any thickness required.
Pre-Fi Word Element Neopri and Rubble Metal	Chemicals Photographic solutions Pitot tubes	These elements are waterproof and still flexible. Molded-in leads make these heating units uniquely applicable to immersion heating applications. Can be applied with adhesive if necessary, or mechanically mounted. Available in odd shapes. Neoprene construction for applications in which chemical resistance of Neoprene can be utilized. Temperature limitations: —60° to °167F.	Up to 24" x 24". Volts: 6 to 240. Watts: Fractional to 3 watts per sq. in. Thickness: .060" to any thickness required.

CHROMALOX SALES AND ENGINEERING REPRESENTATIVES

BOSTON 11, Mass., Leo C. Peikus and Co., Inc., 683 Atlantic Ave. .. Liberty 2-1941
BUFFALO 2, N. Y., Niagara Electric Sales Co., 505 Delaware Avenue. Summer 4000
CHARLOTTE 2, N. C., Ranson, Wallace & Co.,
116\(^1\)2 East Fourth St. EDison 4-4244; FRanklin 5-1044 CHATTANOOGA 1, TENN., H. R. Miles and Associates, P. O. Box 172 AMherst 5-3862 CHICAGO 5, ILL., Fred I. Tourtelot Co., 407 S. Dearborn Street....Harrison 7-5464

MIDDLETOWN, CONN., Dittman and Greer, Inc., 33 Pleasant Street. Diamond 6-9606 MILWAUKEE 3, WIS., Gordon Hatch Co., Inc., 531 W. Wisconsin Ave. Broadway 1-3021 MINNEAPOLIS 4, MINNESOTA, Voico Company, 831 South Sixth Street Federal 6-3373 NASHVILLE 4, TENN., H. R. Miles and Associates, 2500-B Franklin Rd. Cypress 2-7016 NEW YORK CITY, N. Y. .See "Bloomfield, N. J."

NEW YORK CITY, N. Y.

OMAHA 2, NEBRASKA, Midwest Equipment Co., 1614 Izard St. ... Atlantic 7600
PHILADELPHIA, PA. See "Bala-Cynwyd, Pa." (Suburb of Philadelphia)
PITTSBURGH 6, Pa., Woessner-McKnight Co.,
1310 Highland Bldg., 115 S. Highland Ave. ... EMerson 1-2900
PORTLAND 9, OREGON, Montgomery Brothers, 1632 N.W. Johnson St. .. Capitol 3-4197
RICHMOND 26, VA., O.M. Thompson, Westhampton Sta., P.O. Box 8762 ATlantic 8-8758
ROCHESTER 4, N. Y., Niagara Electric Sales Co., 133 Clinton Ave., S. HAmitton 6-2070
ST. LOUIS 1, MISSOURI, C. B. Fail Co., 317 N. 11th St., Suite 1001 Chestnut 1-2433
SAN FRANCISCO 3, CAL., Montgomery Brothers, 1122 Howard St. .. Underhill 1-3527
SYRACUSE 6, N. Y. R. P. Smith Co., Inc., 2507 James Street HOward 3-2748
WICHITA 2, KANSAS, Fraser D. Moore Co.,
Room 211 Derby Building, 352 No. Broadway Amherst 2-5647
EXPORT DEPARTMENT, 1010 Schaff Building, Philadelphia 2, Pa. ... LOcust 4-4020



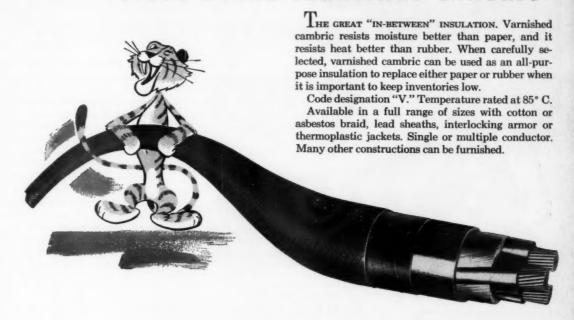
CHROMALOX

Electric Heat INDUSTRIAL . COMMERCIAL . RESIDENTIAL

EDWIN L. WIEGAND COMPANY 7637 Thomas Boulevard • Pittsburgh S, Pa.

USS) Tiger Brand ELECTRICAL WIRE & CABLE

TIGER BRAND VARNISHED CAMBRIC



TIGER BRAND AMERBESTOS

American Steel & Wire offers a full range of heatresistant asbestos-insulated wire and cable. Amerbestos uses felted asbestos which is applied to the wire directly, or in the form of felted tape or roving. Felted asbestos insulation withstands continuous exposure to extreme heat and gives long, uninterrupted service under conditions that would soon destroy other types of insulation.

Following types are available:

A-plain asbestos

AA—asbestos with asbestos braid

Al—impregnated asbestos without asbestos braid

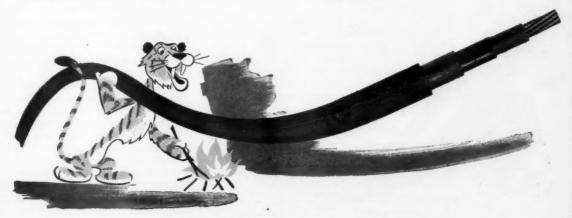
AIA—impregnated asbestos with asbestos braid

AVA—asbestos with varnished cambric

AVL—asbestos with varnished cambric and lead sheath

AVB—asbestos with varnished cambric and cotton braid

Many constructions and sizes can be supplied, such as special wires and cables for rheostats, stoves, switchboards, mining equipment, electrical fixturesas well as a wide range of heavy-duty, high voltage power cables.



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440 for ions. I to 15 higher ate is to any red.

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6-9606 1-3021 6-3373 2-7016 N. J. c 7600 elphia) 1-2900 3-4197 8-8758 6-2070 1-2433 1-3527 4-7297 3-2748

2-5647 4-4020

U. S. A.





TIGER BRAND PAPER CABLE

Lead sheaths are applied under high pressure to insure dense, homogeneous surface. Lead melting tanks are kept in inert atmosphere to prevent formation of impurities. Arsenical or copper-bearing lead alloys can be furnished for sheaths. The former has more resistance to bursting, bending and vibration, but it is more expensive and difficult to pull than standard lead sheaths.

Many special constructions are available as standard production. Sheaths can be covered with a range of protective materials, such as metallic armor, jute, duck tapes, reinforced rubber or reinforced neoprene.



TIGER BRAND ELEVATOR CABLE

American Steel & Wire is one of the largest manufacturers of elevator cable. Flexibility is designed into the cable so it will bend easily at the bottom of the shaft, yet not have so sharp a loop that wires will be deformed

Following types are standard: Type E-rubber and cotton -for general use.

Type EO-neoprene jacket -for hazardous locations. Type ET-thermoplastic and rayon -fire-retardant, for general

All 3 types are available with steel supporting fillers if desired.

Type ET combines maximum fire protection and small diameter (latter due to thinner insulation).

American Steel & Wire can also furnish a complete line of Tiger Brand annunciator cable, lighting cable, signal cable and hatch wire for use in and around elevator shafts.



RR CABLE When several RR cables are com-

you have a self-supporting aerial cable for service drops and power

bined with a bare messenger strand,

feeders.

Many different rubber insulations are available to meet your special problems. Amerine type RWS is recommended for low-voltage applications. For high voltages and ozone resistance, Amerzone type O (oil base rubber) is often indicated. Amerzone type B (butyl rubber) is the newest type. Since it is moistureand ozone-resistant, it is often used to replace type BWS or type O.

ELECTRICAL WIRE AND CABLE

TIGER BRAND BUILDING WIRE

It is not possible to list the many different Tiger Brand building wires and cables available. The following are a representative group:

Service Drop Cable

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Different constructions are available in three basic styles:

- 1. Self-supporting types
- 2. Imbedded neutral types
- 3. Flat tape neutral types

Service Entrance Cable

Standard construction is the SE type U, consisting of 2 rubber conductors with concentric neutral plus tape and braid. Gray paint finish.



INTERIOR WIRES

Туре	Temp. rating	Construction	
R	60°C.	rubber insulation, moisture- and flame-retardant braid	
RH	75°C.	heat-resistant rubber and flame-retardant braid	
RW	60°C.	moisture-resistant rubber and flame-retardant braid	
RHRW	60°C. wet-75°C. dry	moisture- and heat-resistant rubber and flame-retardant braid	
RHW	75°C. wet or dry	moisture- and heat-resistant rubber and flame-retardant braid	
T	60°C.	thermoplastic	
TW	60°C.	moisture-resistant thermoplastic, no outside jacket	
TA	90°C.	thermoplastic and asbestos with flame-retardant cotton braid (for switchboard wiring only)	

Above wires and cable can be furnished with aluminum conductors. Jackets can be flame-retardant cotton braid or lead sheath with rubber.

TIGER BRAND AMERCLAD

Amerclad is our term for a complete line of *heavy-duty* portable cords and cables. The jackets for *all* cords and cables are vulcanized in a lead sheath to insure dense rubber and concentric conductors.

All cords and cables are marked with molded identifications to facilitate future record-keeping.

The high-neoprene-content jackets are extremely flexible, and have phenomenal resistance to abuse, sunlight, grease and oil or acid water. Following types are standard:

Type SO portable cords—available with 1 through 8 conductors, conductor size from AWG 18 to AWG 10. Careful filler and jacket application makes this cord highly resistant to impact or crushing.

Type SJO portable cords—have same construction as above type SO cords except that the jacket is lighter. Available with 2, 3 or 4 conductors, AWG 18 and 16. Welding cable—has same features as above except for number of individual wires per conductor. Size AWG 1, for example, has 2107 separate wires to prevent kinking and relieve strain on operators' wrists. All welding cables are single-conductor. Conductor size ranges from

AWG 8 to 300,000 CM.

Other Amerciad cables—Heavyduty multiple-conductor cables are manufactured for power shovels of any size, dredges, mining machines and comparable equipment. Voltage ratings up to 15,000 can be furnished, with conductor sizes to 1,000,000 CM.

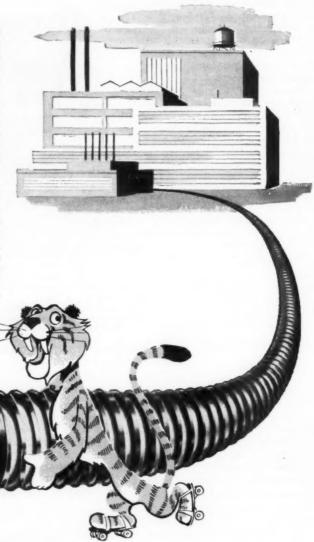


TIGER BRAND ARMORLOKT CABLE

Tiger Brand Armorlokt Cables are made with insulated conductors, with or without a protective covering, incased in a flexible metallic armor applied at the factory. Outer diameters range up to four inches; voltage ratings are available to 15 kv.

Armorlokt cables may be armored with galvanized steel, aluminum, bronze or stainless steel. They are available with rubber, butyl, asbestos or varnished cambric insulation, and any combination of insulation and cable core covering can be furnished.

Compared to rigid conduit installations, Armorlokt commonly saves 55% to 75% in space and requires approximately half as much time to install. Wiring layouts can be very flexible-a big point if machinery may have to be relocated. In case of damage, Armorlokt can be spliced anywhere along its length with a splice box. They can even be color-coded in the racks when colored Ampyrol (P.V.C.) jackets are furnished over the interlocking armor.



A standard Tiger Brand cable for every special job! Asbestes Wire and Cable • Mold Cured Portable Cord Shovel & Dredge Cable . Paper & Lead Cable . Varnished Cambric Cable . Interlocked Armer Cable . Special Purpose Wire & Cable . Aerial, Underground and Submarine Cable USS, Tiger Brand, Americad, Americator and Armorlokt are registered trademarks



American Steel & Wire **Division of**



United States Steel

Columbia-Geneva Steel Division, San Francisco, Pecific Coast Distributors ion, Fairfield, Ala., Southern Distributors - United States Steel Export Company, Distributors Abroad

imment

LUXTROL

Increase Your Profits... Win Satisfied Customers... This Easy Way:



"The boss says we made an extra \$500 today! We're installing LUXTROL light controls instead of old-fashioned 'off-on' switches. This customer proved light control boosts business."



"He switched —from switches to LUXTROL—and I made \$1000 extra! I'm glad I talked light controls instead of old-fashioned switches. Now he's sold on the idea — and he'll sell others for me."



"I sold him \$200 worth. He upped me a thousand! After he tried a LUXTROL type D2000 in one part of his restaurant, it helped sales so much he had me add other LUXTROLS."



"Sure, my contractor made \$500 extra, but light control makes profits for me! It cost me money to switch from old-fashioned 'on-off' lighting, but I'm willing to pay more to make more."

Whenever you renovate or do a new wiring job for a restaurant, cocktail lounge, night club, hotel, conference room, executive office, funeral home or church... you have a chance to make extra profits by replacing "off-on" switches with "all-level" LUXTROL light control equipment. By controlling the light level your customer can set a mood, put people in a frame of mind to linger longer and spend money, or to move faster and make way for more. You make more money . . . so does your customer.

See LUXTROL light control equipment on the next three pages.

JUST DIAL THE RIGHT AMOUNT OF LIGHT FOR



LUNCH, COCKTAILS, DINNI



THE TYPE OF MEETING



THE TIME OF DAY

LUXTROL

You Increase Your Profits... Win Satisfied Customers

Light control has long been used in the theatre to create the appropriate audience mood for the appreciation of stage presentations. Now LUXTROL brings all the inherent advantages of light control to provide light that is always exactly right for every activity, mood and atmosphere wherever people con-

gregate. Operation is always cool, safe and economical... unlike resistive type controls that regulate by wasting power and dissipate watts in the form of heat. Any number of lights up to the rated capacity can be controlled.

NON-INTERLOCKING LUXTROL light control equipment

... find wide use in auditoriums or single rooms such as restaurants, cocktail lounges, funeral homes, offices, etc. where only a few circuits require control. They consist of one or more units operating in unison on a common shaft. Standard units are available in capacities from 1,000 to 30,000 watts for incandescent, cold cathode or fluorescent. Send for Bulletin L755N.



TYPE D1000H

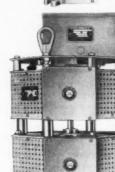


TYPE D5000





TYPE D2000



MOTOR DRIVEN MODELS

All LUXTROLS of the D2000 and D5000 series are available with motor-drive. From a "raise-lower" switch, lighting is dimmed or brightened smoothly, from blackout to full-on. Various speeds are available.



TYPE DM5000

TYPE DM5000-4E



UPERIOR ELECTRIC COMPAN

36 JAY AVENUE, BRISTOL, CONNECTICUT

STANDARD NON-INTERLOCKING LUXTROL LIGHT CONTROL EQUIPMENT

RATINGS

			KA	1114/02			
Line Volts	Line Frequency	No. of Circuits	Incandesc Cathode Watts Per Circuit	ent & Cold Lighting Total Watts	Fluoresce Type 40 40 Watt Rap Lamps Per Circuit	ont Lighting OWT12RS old Start Only Total Lamps	Type*
WIRE 1 PHAS	SE						
100	504501		1000	1000	15	15	D1000H
120	50/60†	1	1000	1000	15	15	D1000R
120	50/60t	1	2000	2000	30	30	D2000
120	50/601	1	2000	2000	30	30	DM2000
120	50/60t	1	5000	5000	75	75	D5000
120	30/001		3000	3000	/3	/5	DM5000
120	50/60	1	10000	10000	_	_	D5000-2P
							DM5000-2P
120	50/60	1	15000	15000	_	_	DM5000-3P
120	50/60	1	20000	20000	_	_	DM5000-4P
120	50/60	1	30000	30000	-	-	DM5000-6P
120	50/60t	2	2000	4000	30	60	D2000-2E
	/				-		DM2000-2E
120	50/60t	2	5000	10000	75	150	D5000-2E
	50/60	-	10000	20000			DM5000-2E
120	50/60	2	15000	30000	-	-	DM5000-2E2P
120	50/60	2	15000	30000	-	-	DM5000-2E3F D2000-3E
120	50/60†	3	2000	6000	30	90	DM2000-3E
120	50/60t	3	5000	15000	75	225	DM5000-3E
120	50/60	3	10000	30000	- 75	-	DM5000-3E2F
120	50/60†	4	5000	20000	75	300	DM5000-3E2F
120	50/60†	6	5000	30000	75	450	DM5000-6E
		0	3000	30000	/3	430	DIMOGOGE
WIRE 1 PHA	SE						50000 05
240/120	50/601	2	2000	4000	30	60	D2000-2E
							DM2000-2E
240/120	50/60t	2	5000	10000	75	150	D5000-2E
0101100	50/60		10000	20000	-		DM5000-2E DM5000-2E2F
240/120	50/60 50/60	2	15000	30000	_	-	DM5000-2E3F
240/120			5000	20000	75	300	DM5000-2E31
240/120	50/60† 50/60†	6	5000	30000	75	450	DM5000-4E
		0	5000	30000	/5	450	DW2000-9E
WIRE 3 PHA	SE						
208/120	50/60t	3	2000	6000	30	90	D2000-3E
						7.7	DM2000-3E
208/120	50/60†	3	5000	15000	75	225	DM5000-3E
208/120	50/60	3	10000	30000	_	-	DM5000-3E2
208/120	50/60†	6	5000	30000	75	450	DM5000-6E

†When used with fluorescent lighting the frequency must be 60 cycles. *M denotes motor driven types.

CONTROLLED LIGHTING FOR THE HOME-

A New Source of Profits... Easy to Install

LUXTROL light controls of the WBD series are for mounting in a wall . . . vary color schemes, rearrange accents or change the entire mood of the room. They offer the builder a new sales promotion device and the electrical contractor new profits. They are easy to install in new construction or existing buildings. Available in 450, 800 and 1800 watt ratings. Stocked by leading electrical wholesalers. For full information send for Bulletin L758W.









LUXTROL in a control equipment

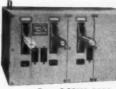


for Auditoriums, Theatres, Commercial Buildings

PACKAGED LUXTROLS

PACKAGED LUXTROLS provide all the facilities of a large switchboard at low cost. Available in ratings from 6,000 to 15,000 watts. Ideal for school, church, community amateur group and small theatre. Easy to install and operate, and can be used for incandescent, rapid-start fluorescent or cold cathode installations. Packaged LUXTROLS are available in two series: DC-1000 series consist of six non-interlocking 1000 watt controllers and are available with or without an electrical 6000 watt master. DC-2500 series are available in packages of 3, 4, 5 or 6 controllers with individual controller ratings of 2500 watts. Controllers can be mechanically interlocked with each other. Write for Bulletin L157P.





Type DCRN6-1000

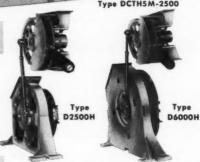
Type DCRN3-2500



Type DCTH5M-2500

NTERLOCKING LUXTROLS

INTERLOCKING LUXTROLS are the leading choice of switchboard manufacturers because of their flexibility, ease of operation, smooth control and low maintenance. They are available in single units in 2500 and 6000 watt ratings. They may be operated independently, mastered or grand mastered. Write for Bulletin L458I.



MAGNETIC AMPLIFIER SYSTEM

MAGNETIC AMPLIFIER SYSTEM offers the ultimate in light control equipment. Provides control from a compact, console-type board with the magnetic amplifiers installed in any out-of-the-way space. Contains no

moving parts, relays or tubes insuring long, maintenancefree life. Available in 1200, 3000, 6000, 10,000 and 15,000 watt capacities. Send for Bulletin L858MA.



Type MB6000

THE	SUPERIOR ELECTRIC	COMPANY
	36 IAV AVENUE RRISTOL CONNECTICUT	

Please send me the following Bulletins: Non-Interlocking LUXTROLS — Bulletin L755N □ Wall recessed LUXTROL WBD series — Bulletin L758W

Packaged LUXTROLS — Bulletin L157P

Interlocking LUXTROLS —Bulletin

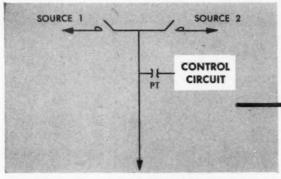
L458I ☐ LUXTROL Magnetic Amplifier System — Bulletin L858	MA 🗆
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Company	
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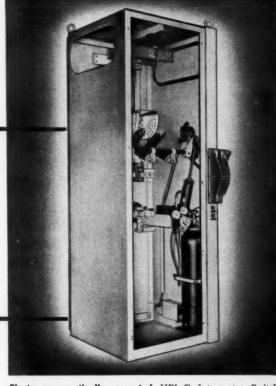
ELECTRO-PNEUMATIC OPERATOR



Remote-control pushbuttons for switches scattered throughout a plant, or in a number of plants, may be grouped on a single control panel.



Automatic control requires only the addition of relatively simple control circuitry. In the application shown above, the loss of preferred voltage provides the necessary signal for automatic throwover to the emergency source. Only one PT is required in the load circuit.



Electro-pneumatically operated HPL-C Interrupter Switch shown with fuses, phase barriers, and doors removed. Switch can close safely into faults up to a million kva with current limiting fuses. Maximum safety during maintenance is assured by a key interlock which prevents the fuse door from being opened while the switch is closed.

NOW! Lower-Cost Remote or Automatic Power Control

New electro-pneumatic operator provides pushbutton or fully automatic actuation of R&IE 4.8-14.4 kv interrupter switches

Now you can enjoy the efficiency and convenience of dependable remote or fully automatic power switching at a new low cost. The new R&IE electro-pneumatic operator, significantly less expensive than motor driven or hydraulic operators, gives you fast, safe, centralized control of interrupter switches located throughout a plant, or in many plants. Where you require automatic operation, suitable relay circuits can provide switch control as a function of overload, loss of voltage or other special condition.

Adequate power for either remote or automatic control can be supplied by a potential transformer. The energy required for positive, high speed switch actuation is developed by a solenoid controlled, double acting, heavy duty air motor located inside the switch cubicle. Pneumatic pressure is supplied by a standard nitrogen cylinder or by dry compressed air from the plant system. One cylinder contains sufficient pressure for at least 500 complete operations.

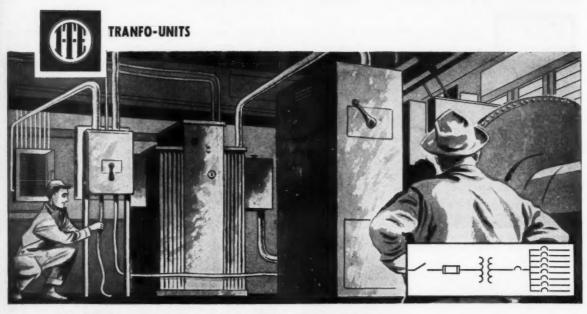
All new R&IE Interrupter Switches, in ratings from 4.8 through 14.4 kv and 600 through 2000 amp, can be supplied with an electro-pneumatic operator. Many existing switch installations can have electro-pneumatic operators added to them. For complete information, consult your nearest I-T-E sales office or write R&IE Equipment Division, Greensburg, Pa. In Canada: Eastern Power Devices Ltd., Port Credit, Ont.



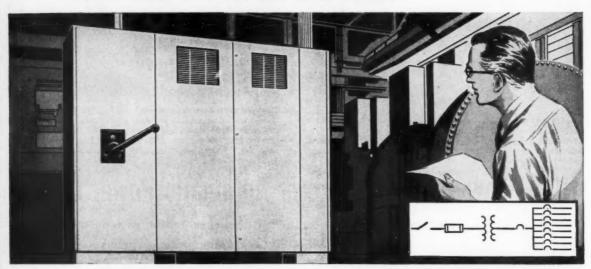


I-T-E CIRCUIT BREAKER COMPANY

R&IE EQUIPMENT DIVISION · GREENSBURG, PA.



WHY BUY AN EYESORE?



A TRANFO-UNIT COSTS NO MORE

It's neat, compact and completely self-contained—a practical, economical way to bring in your electric power at the low-cost higher voltage. You get the transformer, primary disconnect, and secondary protective devices all included in one neat, safe package.

The I-T-E Tranfo-Unit costs no more than hodgepodge arrangements of assorted gear. But it's so much more satisfactory. You place one order... that saves time and trouble.

It comes complete . . . that saves extra engineering. It's delivered in one piece . . . that saves installation labor.

For supermarkets, schools, office buildings, factories and many other applications, the I-T-E Tranfo-Unit is ideal. Available in a wide range of capacity ratings. Get all the facts now. Write I-T-E Circuit Breaker Company, Transformer & Rectifier Division, 19th & Hamilton Sts., Philadelphia 30, Pa.



I-T-E CIRCUIT BREAKER COMPANY

PHILADELPHIA, PENNSYLVANIA



I-T-E magnetic trip Type ETI circuit breakers provide readily accessible trip adjustment.

FOR MOTOR APPLICATIONS... ETI BREAKERS INSURE BETTER PROTECTION

Type ETI magnetic trip circuit breakers employ specially designed overload devices to provide pinpoint, instantaneous short-circuit protection. When used in conjunction with motor protective relays, Type ETI molded case circuit breakers represent the ultimate in motor protection.

A new, informative booklet—yours for the asking—explains in detail why Type ETI molded case circuit breakers insure better protection.

As manufacturers of all types of circuit breakers—and the manufacturers of industry's most complete line of molded case breakers—I-T-E offers this booklet as a service to the electrical industry. Small Air Circuit Breaker Division, 19th & Hamilton Sts., Phila. 30, Pa.



WRITE TODAY FOR THIS NEW BOOKLET

Please send me your	new booklet	TYPE ETI I BREAKERS	MOLDED FOR MI	CASE CIRCUIT DTOR CIRCUITS"
Name				
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I-T-E CIRCUIT BREAKER COMPANY

PHILADELPHIA, PENNSYLVANIA



to assist you in selecting the types best suited to your needs

There are more than 17,000 items in the Crouse-Hinds line of Condulet® and floodlighting equipment. Each is designed with some specific advantage or quality that makes it best suited for a particular application.

Of course, no engineer, electrician or contractor with a regular job 'to do, could possibly keep in mind all the pertinent data and information concerning each of these items. That's why Crouse-Hinds maintains a factory-trained field staff of 80 graduate E.E.'s and technical men.

Their job is to confer with the users of Crouse-Hinds equipment and to point out the reasons why certain Condulet equipment or floodlights are better suited for a particular job than others. With a broad grounding in the details of the National Electrical Code and a trained alertness for spotting explosion hazards in unsuspected places, they make a consulting or factory-engineer's job less burdensome.

Their service is prompt and without obligation. Naturally they usually work on jobs of sufficient size to merit top-level attention, but even a small job with a large problem gets the same careful appraisal. If you'd like to talk or correspond with such a specialist, just write, wire or phone.

*Dust-ignition-proof

Main Office and Factory: Syracuse, N. Y. Crouse-Hinds Company of Canada, Ltd.: Toronto, Ont.

These Crouse-Hinds Bulletins will give you Specific Information on Particular Problems

Check coupon below to receive the ones you want.



2605 Night Time is May Time (Sports Floodlighting)



2655 Condulets — National Electrical Code



2658 Installation of Explosion-Proof Condulets

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2660 Electrical Equipment for Hazardous Locations



2678 The Growing Community Needs Crouse-Hinds Traffic Signals



2681 Aluminum Con-



2693 Safe New Lighting System for Class 1, Groups A and B Hazardous Locations



2694 Explosion-Proof Condulets for Hospitals



2695 Portable Underwater Floodlight



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2701 Sportslighting for Night Football



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2704 Service Sta-



2705 Mercury Vapor Lighting: Hazardous



2706 Crouse-Hinds Electrical Equipment

The Crouse-Hinds HAZARD FINDER Helps you Stop Explosions Before They Start!

You can locate the hidden probabilities of electrically-ignited explosions in your plant with the Crouse-Hinds Hazard Finder. Here are 13 check questions to which electrical personnel should know—must know—the answers.



Both the questions and the evaluations of your answers are based on the latest findings of the National Fire Protection Association. They reflect, in non-technical language, the Association's standard recommendations for thorough, effective control of electrical explosion hazards.

FREE

Send coupon today for your Hazard Finder, and any of the bulletins you have checked at the left.

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2605	2693		Crouse-Hinds Company 1213 Wolf St., Syracuse 1, N. Y.
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2658	2695	2704	checked.
2660	2696	2705	Position
2678	2697	2706	City
2681	2701		ZoneState

Index of Phelps Dodge

Wires and Cables	Type Letter	Habirshaw Trade Name or Designation	Maximum Operating Temperature	USE	
	R	Flamestop Code	60 C (140 F)	Dry Locations	
	RF	Flamestop Code	60 C (140 F)	Fixture Wire	
	RH	Flamestop Heat- Resistant	75 C (167 F)	Dry Locations	
	RW	Flamestop Moisture- Resistant	60 C (140 F)	Dry and Wet Locations	
	RH-	Flamestop Heat or	75 C (167 F) as RH	Dry Locations as RH	
	RW	Moisture-Resistant RH-RW	60 C (140 F) as RW	Dry and Wet Locations as RW	
The same and a strong and a partners	RHW	Flamestop Heat and Moisture Resistant	75 C (167 F)	Dry and Wet Locations	
	RHH	Flamestop Heat- Resistant	90 C (194 F)	Dry Locations	
	RL.	Rubber Lead	60 C (140 F)	Wet Locations and other Special Conditions	
	RHL	Heat Resistant Rubber Lead	75 C (167 F)	Wet Locations and other Special Conditions	
PDX-12-2	NM	PD-X Nonmetallic- Sheathed Cable	60 C (140 F)	For Wiring Houses, Rural Buildings, Small Stores, and Shops.	
THE DESIGNATION THE OF A	UF	Perma-Dure Nonmetallic-	60 C (140 F)	UF: Underground Feeder and Branch Circuit Cable for Direct Burial.	
HABIRSHAW PERMA-DURE TYPE UF 14/2	UF-NMC	Sheathed Cable		NMC: For Interior Wiring in Mois or Corrosive Locations.	
	TW	Habirdure Thermo-	60 C (140 F)	Dry and Wet Locations	
	TF	plastic Insulated	60 C (140 F)	Fixture Wire	
Canada	TW	Petro-Dure Thermo- plastic Insulated Nylon Jacketed	60 C (140 F)	Moist locations and where exposed to mineral oil, liquid gasoline and gasoline vapor.	
	None	Habirdure Machine Tool, Control, and Switchboard Wire	90 C (194 F) in air 80 C (176 F) in oil	Machine Tool, Control and Switch- board Wiring	

PHELPS DODGE COPPER PRODUCTS CORPORATION

Wires and Cables



Wires and Cables	Type Letter	Habirshaw Trade Name or Designation	Maximum Operating Temperature	USE
	None	Habirdure Appliance Wire	105 C (221 F) IN AIR 80 C (176 F) IN OIL	Appliance Wiring
2.0	SE	Service Entrance Type SE—Style U Unarmored	75 C (167 F)	Service Entrance or Combination Service Drop & Service Entrance
=	SE	Service Entrance Type SE—Style A Armored	75 C (167 F)	Service Entrance or Combination Service Drop & Service Entrance
	SD	Service Drop Type SD	60 C (140 F)	Service Drop
WITH THE UNIT CONTINUES IN CASTON	USE	Service Entrance Type USE	60 C (140 F)	Underground Service Entrance, Direct Burial.
	v	Varnished Cambric Braided	85 C (185 F)	Dry locations only. Smaller than No. 6 by special permission.
	VL	Varnished Cambric Lead	85 C (185 F)	Wet or Dry locations. Smaller than No. 6 by special permission.
	None	Type RR	75 C (167 F) Low Voltage 85 C (185 F) High Voltage	General Purpose for Direct Burial, Aerial, Conduit and Underground Duc Installations.
=====	S or SO	Hard Service Cord	60 C (140 F)	Pendant or portable extra hard usage in damp locations; SO for oil resistance.
	or SJO	Junior Hard Service Cord	60 C (140 F)	Pendant or portable hard usage in damp locations; SJO for oil resistance.
	SP (Formerly POSJ)	All Rubber Parallel Cord	60 C (140 F)	For use in pendant or portable appli- cations in damp locations not subject to hard usage

HABIRSHAW BUILDING WIRES AND CABLES



timesaving tools for electricians

GREENLEE TOOL CO., 1749 COLUMBIA AVE., ROCKFORD, ILL.

CHOOSE FROM THIS COMPLETE LINE OF FAST HYDRAULIC BENDERS

Fast, lightweight power benders...90° bends with one ram stroke

- · High-strength aluminum and steel for minimum weight, maximum strength.
- Easily carried by one man or wheeled on pipe supports.
 Rotating universal pipe supports handle all pipe and conduit sizes. Ram fits Greenkers thin-wall conduit, tubing, and bus-bar bending attachments.
 Complete range of sizes \(\frac{1}{2}'' \) through 4". Operate in any position.

No. 880 Hydraulic Bender for ½" through 2" pipe and rigid conduit.

No. 883 Hydraulic Bender for ½" through 3" pipe and rigid conduit.

Both operate with GREENLEE 798 Power Pump or 768-M4 Hand Pump.

No. 884 Hydraulic Bender for ½" through 4" pipe and conduit. Operates with GREENLEE No. 798 or No. 797 Power Pump or No. 1726 Hand Pump.





Heavy-duty power bender...100 tons' ram pressure

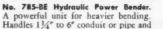
No. 884

Versatile segment-type hydraulic benders

Make bends of varying radii and degree for all bending measurements. Built-in hand hydraulic pump. Rams fit GREENLEE thin-wall conduit, tubing, and busbar bending attachments. Can be used with Greenlee No. 798 or No. 797 Power Pumps.

No. 770 Hydraulic Bender for 1/2" through 3" pipe and conduit.

No. 775 Hydraulic Bender for 1/2" through 5" pipe and conduit.



Handles 1½" to 6" conduit or pipe and is rugged enough to bend 5" double extra-heavy 90° with one ram stroke. Built-in hydraulic pump can be driven by either an electric motor or gasoline engine.



Thin-wall conduit benders...fast one-shot 90° bends

Greenlee thin-wall benders with aluminum shoes and follow bars. Make full 90° bend with one ram stroke without crushing or kinking of thin-wall (E.M.T.) conduit.

Nos. 770-T and 775-T Thin-Wall Conduit Benders. For bending 34" - 2" thinwall conduit.

Nes. 880-T, 883-T, and 884-T Thin-Wall Conduit Benders. For bending ¾ 2" thin-wall conduit.



Bus-bar benders...U-bends, 90°, offset bends...bar up to

GREENLEE Bus-Bar Benders make accurate bends in a wide range of types

Nos. 770-BB, 880-BB, 883-BB Bus-Bar Benders. For bending copper up to 34" x 4".

Nos. 775-BB and 884-BB Bus-Bar Benders. For bending copper up to 34" x 6".





NO. 1800 RATCHET HAND BENDERS

EFFICIENT CABLE PULLERS

Easily bend 1/2", 3/4", and 1" pipe and conduit as much as 180°. Ratchet feature permits short, powerful strokes. Built-in bending gauge reads 0° - 90°. Swing-away pipe clamping device. Base receives threaded pipe legs to form stable, convenient "horse."



The Greenlee Cable Puller is a simple compact unit which exerts up to 7500 lb maximum pull. Two speeds. Clamping device fastens directly to conduit - allows pulling in line with conduit, prevents hanger loosening. Attachment for pulling from concealed conduit.



PRECISION-MADE **BORING TOOLS** FOR EVERY BRACE OR POWER JOB

Jobs go smoother and cost less when you standardize on precision-made GREENLEE power and brace bits. Complete line gives smooth, accurate boring, fast chip clearance, long bit life in every type of job.



HIGH-PRESSURE HYDRAULIC POWER PUMPS—EXCLUSIVE FAST APPROACH

GREENLEE No. 798 Series...6,000 psi continuous, 10,000 psi intermittent pressure

return of ram.

- Two-speed action. Quick approach of the ram, automatic change-over to tast high-pressure delivery when ram pressure exceeds 150 psi.
- · Easily carried by one man. Weighs only 64 lb. High-strength aluminum and steel construction.
- Operates Greenlee Nos. 770, 775, 880, 883, and 884 Pipe and Conduit Benders, and No. 746 Hydraulic Knockout Punch Driver. Also adaptable to a variety of rams and jacks with manual,

gravity, or spring return of the ram or piston. · Available with 4-way valve for hydraulic

No. 798-AC-SA Power Pump. Powered by built-in 34-hp dual-voltage 115-230 volt, a-c electric motor. No. 798-CO-SA Power Pump. Powered by a 1/2-hp 115-volt ac-dc universal electric motor.

No. 798-GM-SA Power Pump. Powered by a 1.7-hp 4-cycle air-cooled gasoline engine.



No. 798-AC-SA

GREENLEE No. 797 Series...up to 213 cu in. per min. delivery at 10,000 psi

High-volume delivery means higher speed. Deliver 106 cu in. of oil per minute at 10,000 psi maximum pressure with 2-hp electric motor, 213 cu in. of oil per minute with 3-hp motor.

• Develop 6,000 psi continuous pressure, up to 10,000 psi intermittent.

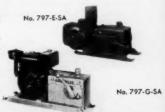
Portable—pump unit on angle iron base.
 Operate Greenlee Nos. 770, 775, 880, 883, and 884 Benders and No. 790 Pipe Pusher.

Adaptable to numerous rams, jacks, presses, etc.

· Available with 4-way valve for hydraulic return of ram.

No. 797-E-SA Power Pump. Powered by a 2-hp or 3-hp 1755 rpm 220/440-volt, 3-phase, a-c electric motor.

No. 797-G-SA Power Pump. Powered by a 41/2-hp 4-cycle air-cooled gasoline engine.



FAMOUS GREENLEE KNOCKOUT PUNCHES AND PUNCH DRIVERS

For fast, easy enlarging of knockouts or cutting new holes for conduit in metal boxes and cabinets. Complete range of punches to cut holes for 1/2" through 5" conduit in 10-gauge metal. Slugs drop loose in die—you just tip them out. Hand and hydraulic drives.

Convenient knockout punch sets

in leather cases









No. 735 Knockout Punch Set. Four punches packed in leather case for cutting $\frac{7}{6}$ ", $1\frac{2}{2}$ ", $1\frac{1}{2}$ ", $1\frac{11}{6}$ " holes for $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1", $1\frac{1}{4}$ "

No. 737 Knockout Punch Set. Two punches packed in leather case for cutting 115%", 2%" holes for 11/2" and 2" conduit.

Knockout punches for 2-1/2"-5" conduit

No. 738 Knockout Punch cuts 21/8" hole for 21/2" conduit.

No. 739 Knockout Punch cuts 31/2" hole for 3," conduit.

No. 741 Knockout Punch cuts 4" hole for 31/2" conduit.

No. 742 Knockout Punch cuts 41/2" hole for 4" conduit. No. 743 Knockout Punch cuts 5%" hole for 5" conduit.



Ball bearing knockout punch drives .. save time, work

GREENLEE ball bearing drives reduce friction and cut to a minimum the time and effort needed to operate GreenLee Knockout Punches with a wrench. There is a ball bearing drive screw or drive nut to fit every Greenlee Knockout Punch



New ratchet driver-6 to 8 times faster than wrench

No. 1804 Ratchet Knockout Punch Driver. Antifriction, fast-lead thread gives 6 to 8 times faster cutting than wrench method. Operates all Greenlee Knockout Punches for ½" to 3" conduit. Packaged in a metal case with compartment to store 2" and smaller knockout punches. Available with or without punches.

No. 1806 Ratchet Knockout Punch Driver Set. Includes No. 1804 and six GREENLEE Knockout Punches for 1/2" to 3" conduit."

Hydraulic driver... for all GREENLEE Knockout Punches

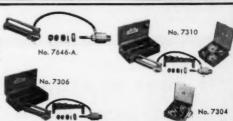
Makes openings in seconds, through 10-gauge metal. A portable hydraulic unit specifically designed for driving all standard Greenlee Knockout Punches. Develops 11 tons of ram pressure. Available separately or in handy portable sets. No. 7646-A Hydraulic Knockout Punch Driver complete with hydraulic pump, ram, and die sleeves, in metal box.

No. 7306 Hydraulic Knockout Punch Driver Set includes No. 7646-A and six punches for 1/2" to 2" conduit in metal box. No. 7310 Hydraulic Knockout Punch

Driver Set includes No. 7646-A and ten punches for 1/2" to 4" conduit in two metal boxes.

No. 7304 Set of Four Knockout Punches. only, for 21/2", 3", 31/2", and 4" conduit in metal carrying case.

No. 743 Knockout Punch, only, for 5" conduit.





New hexagon shank power bits for positive drive. Eliminate slippage on tough power boring jobs . . . fit 1/2" chucks and larger.



See your distributor or write for catalog.



GREENLEE TOOL CO., 1749 COLUMBIA AVE., ROCKFORD, ILL.



Models 30, 45 (right)-Supply or exhaust for small driers, laboratory equipment; Models 60 to 122 (left) for industrial use, air-cooling. Steel housings, direct-driven multi-blade wheels, 5 sizes, Bulletin 8314.





Model CA Ventura Attic Fan—24-48" wheel diameter, 4400-21,500 cfm at 0" sp. 24-, 30-, and 36-inch sizes available with side panels and rubber cushion strips for easy conversion from vertical to horizontal fan. V-belt drive, resilient-mounted motor, ball bearings. Bulletin 7514.

VENTURA FANS



Models 90 to 360. Self-contained V-belt-driven sets, available with or without weatherproof hood. Multi-blade wheels. Supply or exhaust for commercial, public and industrial use. 14 sizes. Bulletin 8314



Model G Ventura-sturdily built, attractive fan suitable for light industrial duty and com-mercial applications. Especially quiet-operating, making it ideal for offices, stores, and lobbies. Smart, baked-enamel finish, polished wire fan guard, totally enclosed motor, streamlined inlet. Wide range of sizes and capacities. Bulletin 6414.



Models A to D. Pressure blowers with cast-iron housings, heat-treated aluminum-alloy wheel, backwardly inclined blades, direct-drive. For forges, oil burners, exhaust systems, small grinding and buffing wheels. 4 sizes. Bulletin 8314.



AEROPEL HOME VENTILATOR

Fan is driven by totally enclosed, constant-speed motor. Rust-proofed, fabricated-steel wall box. Molded white-plastic grille. Ideal for homes, offices, and other confined areas. 400 cfm, free delivery. Bulletin 4714.



Model K Ventura-a ruggedly constructed, heavy-duty propel-ler fan designed for industrial application. High powered, and



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... because American Blower offers a complete line of utility sets and propeller fans - all with certified ratings. For further information write for the bulletins listed, or consult your nearest American Blower branch office. American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.

AMERICAN BLOWER



Division of AMERICAN-Standard

QUALITY PROTECTS YOUR INVESTMENT . . . AMERICAN-Standard QUALITY IS AVAILABLE AT NO EXTRA COST



Sealtite resists corrosive mixture of powdered calcium sulphate, magnesium oxide and magnesium chloride.



Sealtite protects grinder motor leads . . flexes continuously under abrasive coat of metal dust, oil and coolant.



In paper mill's steamy air, Sealtite is covered with oil and wet pulp containing chlorine and caustic soda.

Give the dirtiest jobs to

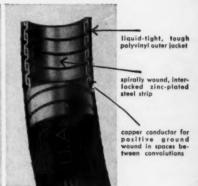
LTITE flexible, liquid-tight conduit



Sealtite makes tight bends on hydraulic press, keeps motor leads free from oil, grease and water.



Sealtite keeps weather out of leads to outdoor pump motor.



Cutaway shows construction details of Sealtite Type UA.

TYPE U.A. - Specifications for Type U. A. (Underwriters' Laboratories Ap-TYPE C.S.A. proved) and Type C. S. A. (Canadian Standards Association Approved). Construction: flexible galvanized steel core, positive ground and tough extruded outer cover.

TRADE SIZE (Ins.)	INSIDE DIAMETER		OUTSIDE DIAMETER		APPR. INSIDE BEND	EST. WGT. (Lbs. Per
	Min.	Max.	Min.	Max.	DIAM.	100 Feet)
3/6	.484	.504	.690	.710	6	30.0
1/2	.622	.642	.820	.840	7	36.6
3/4	.820	.840	1.030	1.050	10	48.2
1	1.041	1.066	1.290	1.315	12	87.7
11/4	1.380	1.410	1.630	1.660	15	116.5

TYPE E.F. † (Extra Flexible)-for machine tools and industrial equipment. (Meets standards set by J.I.C.)

TRADE SIZE (Ins.)	INSIDE DIAMETER		OUTSIDE DIAMETER		APPR. INSIDE BEND	EST. WGT. (Lbs. Per
	Min.	Max.	Min.	Max.	DIAM.	100 Feet
3/6	.485	.500	.695	.710	5	24
1/2	.620	.635	.825	.840	5	29
3/4	.815	.830	1.035	1.050	6	39
1	1.030	1.050	1.295	1.315	8	67
11/4	1.370	1.390	1.635	1.660	10	87
11/2	1.575	1.595	1.875	1.900	12	105
2	2.020	2.040	2.350	2.375	15	135
21/2	2.480	2.505	2.850	2.875	20	198
3	3.070	3.100	3.470	3.500	26	282
4	4.000	4.040	4.460	4.500	34	414

Commercial tolerances apply on above figures.

†Pat. Applied For

Sealtite flexible, liquid-tight conduit gives wiring maximum protection against oil, grease, water, dirt, chemicals, corrosive atmospheres and weather. Nothing gets through its tough, polyvinyl outer covering. It stands up under continuous flexing . . . absorbs vibration, connects moving parts . . . connects misaligned outlets . . . prevents burn-outs. For long runs or short leads it's easy to install . . . saves the time it would take you to cut, bend and fit rigid conduit.

ELECTRICAL WHOLESALERS stock Sealtite in cartons or on non-returnable wooden reels. Buy it in long lengths . . . cut it on the job without waste. Your electrical wholesaler also stocks liquid-tight connectors. For more information write for Sealtite bulletins. Address The American Brass Company, American Metal Hose Division, Waterbury 20, Conn.



SEALTITE FLEXIBLE, LIQUID-TIGHT CONDUIT

AN ANACONDA PRODUCT



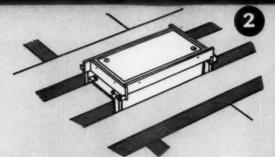
square inches of opening.

PRESET INSERTS-Larger capacity Inserts for easier wire pulling ... over four

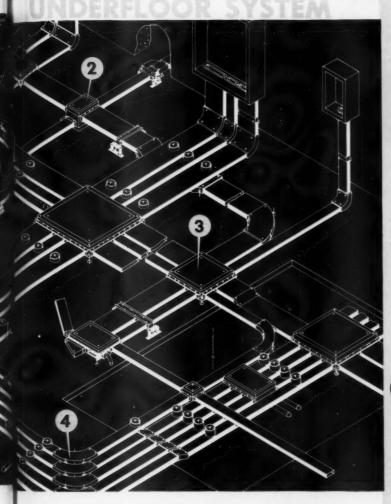
CODED for easy identification

and assembly.

New Series X Junction Boxes for a one Standard Duct layout to a 2 x 3 Standard Duct layout. Compotible with all GATEWAYDUCT components. Fits any place in system—new versatility for Engineers. Built in Tile-Trim.



SERIES Y—TWO LEVEL BOXES—Now a complete two level system with both Standard and Super Duct . . . for revolutionary freedom in underfloor layout. Two levels make feeding the inside ducts on multiple systems easy and still retains the regular one level boxes for day-to-day wiring maintenance. Especially good for industrial and heavy commercial installations. "Knock-outs" in bottom of boxes—built-in Tile-Trim.



ELECTRICAL UNDERFLOOR DISTRIBUTION -A REAL ACHIEVEMENT IN DESIGNING TO -FOR BUILDINGS OF THE FUTURE

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SERVICE FITTINGS—Modern engineered service fittings to meet all Engineering specifications.

COMPLETE LINE—No line of Underfloor Duct is more complete. One, two, three and five Duct Boxes plus a line of doubledeck one and two Duct boxes, new oblong boxes; Standard and Superduct, Duct Supports, L's, Service Fitting, etc., etc., Interchangeability from single to double sized duct...a Gateway Exclusive!



SERIES "Z" JUNCTION BOX—As beautiful as a piece of fine machinery. Series Z from 3 \times 3 to 5 \times 5 Standard Duct. Interchangeable from Standard to Superduct. Built in Tile-Trim—"knock-outs" in bottom of box—new leveling features!



Fittings are designed with built in leveling features—another Gateway Exclusivel



SERVICE FITTINGS — Engineered for beauty and engineering efficiency—greater capacity. Designed to fit all commercial receptacles for Underfloor Duct.



GATEWAY ENGINEERING COMPANY

3233 West Grand Avenue •

Chicago 51, Illinois



the original concrete-tight INDENTER FITTINGS for E.M.T.



Red Throat Insulated Connector







"BM" # 100 Cutter for ½, ¾ and 1" E.M.T.



"BM" #1000 Holder for ½, ¾ and 1" E.M.T.



Cross section

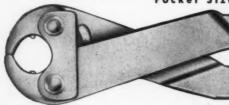




"BM" #600 Changeable Jaw Indenter

THE NEW BM607 INDENTER FOR 1/2" FITTINGS

Pocket Size-Only 10" Long!



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All B-M Indenter Fittings are U.L. All ben incenter rivings are U.S. Approved as concrete-right and all Compression Fittings as rain-tight as well as for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

METHOD

GALVA, . ILLINOIS

these words

CLIFTON CONDUIT

means everything in

RIGID

and E.M.T.

With the same it is TOT or your Cont.

mean any service every way. Careful manufacture by CLIFTON Special hat dip method gives double the zinc protection of a single conduit, both inside and out side. Using CLIFTON Rigid or E.M.T. Conduit edds that exists bit is integrity to every job you do. As conjude for a surveywhere are doing every day.

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WIRE CABLE - RIGID CONDUIT - ELECTRIC METALLIC TUBING - CLIFTALL UF

ELECTRICAL CONSTRUCTION AND MAINTENANCE . . . MID-SEPTEMBER, 1958

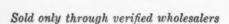
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- 60% Lighter than Iron—easier to handle.
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- Clean-Cut Threads—precise fit, easier installation.
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ROUND FITTINGS AND COVERS

















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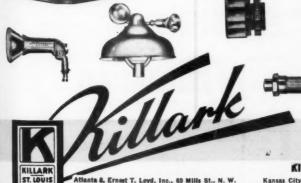




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SECTIONAL pres-SURE-blocks

(for #22 thru #4 wire - 750 volts)

MEDIUM DUTY: #22 thru #8, contacts on 7/14" centers HEAVY DUTY: #18 thru #4, contacts on 5/4" centers

Any number of circuits - assembled without fastening hardware
— Complete blocks or separate sections — Direct or channel
mounted — Integral or separable marking strips — Contacts for
stripped or terminal-ended wires.

"ONE-PIECE" TERMINAL BLOCKS

(for #16 thru #6 wire - 750 volts, contacts on 1/4" centers)

4, 6, 8, or 12 circuits — Screw, thumb screw or hinged covers — Contacts for stripped or terminal-ended wires — Jumper Bars available.

pres-SURE-terminals

Buchanan production-line pres-<u>SURE</u>-terminals with exclusive pres-<u>SURE</u>-crimp are approved for both stranded and solid wire. The pres-<u>SURE</u>-terminals are available in three sizes for wire sizes #22-16, #16-14, and #12-10. Both hand tools and press-dies are

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C-24 pres-SURE-tool features an exclusive four-way crimp which permits splicing over a much broader wire range than any other tool — This single tool splices from 2 #18's thru 3 #8's or 2 #6's with only two sizes of Splice Caps — The pres-SURE-tool also terminates from 1 #16 thru 1 #8 with only one size Termend®Lug.

Nylon Insulators with internal metallic locking rings, snap system insulators with internal metallic locking rings, snap securely and permanently over Splice Caps. Easily and quickly installed even in extremely cold weather — even on flexible wire. Insulators are approved for 600 volts on building wire, 1000 volts in fixtures and signs, in applications to 105°C.

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BUSHEND® INSULATED CONDUIT BUSHINGS - Most compact, lightest weight metallic base insulated bushing available—
Tough wrought aluminum alloy base with high dielectric-strength insulation— Easy-to-tighten clean-cut machined threads— 12 standard trade sizes - ½" thru 6".

SNAP-ACTION KNOCK-OUT PLUGS - Extra heavy gauge steel - heavily plated — Positive snap-action design insures easy permanent installation — 5 standard trade sizes - "" thru I "."

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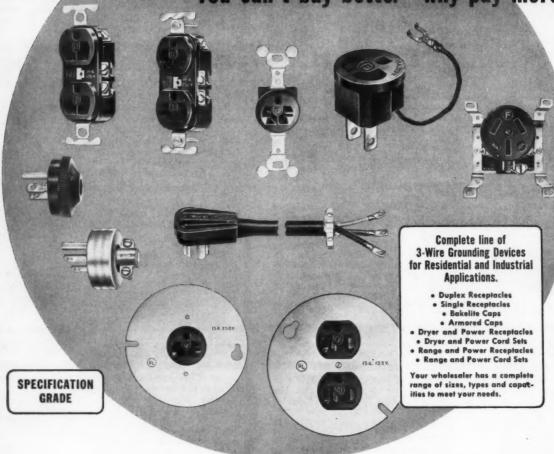
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CAA Specification L-824.

APPLIANCE WIRE

Thermoplastic, U/L.

ARMORED CABLE

Type ACT, U/L.

ARMORED LEAD CABLE

Type ACL, U/L.

BUILDING WIRE

All Types, U/L.

CATHODIC PROTECTION CABLE

Polyethylene Insulation, PVC Sheath.

CONDUIT

U/L. Rigid Steel, Hot-Dipped Galvanized or Black Enameled; Flexible Steel, Hot-Dipped Galvanized; EMT, Electro-Galvanized.

CONTROL CABLES

IPCEA. Rubber, Thermoplastic or VC Insulation; Braid, Neoprene, Thermoplastic or Lead Sheath.

FIXTURE WIRE

All Types. U/L.

SUBMERSIBLE PUMP CABLE

Rubber Insulation, Neoprene Sheath.

WEATHERPROOF LINE WIRE

Neoprene or Polyethylene Type.

NON-METALLIC SHEATHED CABLES

Types NM, NMC-UF, U/L.

PARKWAY CABLES

IPCEA. Rubber or VC Insulation; Lead or Neoprene Sheath; Flat, Plain steel, galvanized, or steel armor.

POWER CABLES

IPCEA. Rubber, VC, or Asbestos and VC Insulation; Braid, Neoprene, Lead Sheath or Interlocked Armor.

SERIES STREET LIGHTING CABLE

IPCEA. Rubber or Thermoplastic Insulation; Neoprene, Thermoplastic or Lead Sheath.

SERVICE CABLES

Service Entrance, Type SE Styles A, U. Type USE, Style RR Service Drop Type SD, Style SDC. Self-Supporting Service Drop: Neoprene or Polyethylene Insulation; Rubber Insulation, Neoprene Sheath.

TREE WIRE

Rubber Insulated, Neoprene Sheath.





RIANGLE CONDUIT & CABLE CO., INC.

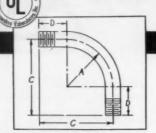
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Manufacturers of Arteries for Electricity, Liquids and Gases

CABLE . CONDUIT . PLASTIC PIPE . BRASS AND COPPER TUBE

SIZES OF SPECIAL

LARGE RADIUS 90° ELBOW



radius "A" offset straight length pipe sizes in inches "C" end "D" unbent

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12"	1'9"	9"	3'0"	1"-21/2" inc.
15"	2'0"	9"	3'6"	1"-3" inc.
18"	2'4"	10"	4'0"	1"-31/2" inc.
24"	2'11"	11"	4'11"	1"-4" inc.
30"	3'5"	11"	5'9"	1"-5" inc.
36"	3'11"	11"	6'6"	1"-6" inc.
42"	4'6"	12"	7'6"	1"-6" inc.
48"	6'0"	12"	8'4"	1"-6" inc.

Also available 45°, 30° and 60°. All are U.L. approved.

Elbows



Conduit of Columbus elbows are U.L. approved. They are available in sizes ½" to 6". Sizes ½" to 2" are conveniently cartoned and all are shipped promptly from factory or from one of ten strategically located warehouses.





for convenient, money-saving connections

Conduit hot-dipped galvanized nipples are carefully threaded and chamfered, rigidly inspected and U.L. approved. Available in all sizes for prompt shipment from factory or ten strategically located warehouses. Sizes: ½" x close to 2" x 6" are all attractively packaged. Larger sizes 2½" to 6", in various lengths, also available.

Specify these Columbus conduit fittings

EMT (1) Elbows

have clear channels

Smooth raceways mean quick installation without cable damage . . . reduce contractors' costs.

Conduit E.M.T. Elbows are made in sizes 1", 1-1/4", 1-1/2", and 2". They are U.L. approved. Conveniently packaged at no extra cost. Shipped promptly from factory or from one of ten strategically located warehouses.

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for right—tight connections

Accurate tapping, careful chamfering and rigid inspection combine to give users completely satisfactory installations. Conduit Couplings are hot-dipped galvanized or black enameled . . . are available in all sizes from ½" to 6". Sizes ½" to 2" are conveniently packaged at no extra cost. Shipped promptly from factory or from one of ten strategically located warehouses.

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for any connection

Conduit running thread is furnished in convenient 3' lengths in three finishes: raw black, electroplated and hot-dipped galvanized. Your orders can be shipped promptly from the factory or from one of ten strategically located warehouses.

Sold only through recognized wholesalers



Columbus

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CONDUIT PIPE PRODUCTS COMPANY -- COLUMBUS, OHIO

Engineered for Dependability

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Tirex Shuttle Car Cable

are careful to specify Simplex-TIREX heavy-duty cables. The durability for which TIREX is famous results from curing and conditioning advanced compounds in a lead mold. This process, originated by Simplex in 1920, has never been surpassed.

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Anhydrex Insulated Submarine Cable

... in Railroading



Railroad Signal Cable

Railroad men rely heavily on Simplex cable for every wiring application, including Power, Control, Communication, Signal, Diesel Wire, Car Wire, and portables. This is especially true where Signal Cable is concerned. Their sense of responsibility both to the road and to the public demands that they use only the finest.

n Industrial Construction Plant engineers can specify any cable core in the C-L-X*



C-L-X Sheath with Thermoplastic Cover

sheath. This closed system is impervious to gases, chemicals and water, and is extremely flexible, strong and light. Can be used aerially or buried. Available with thermoplastic covering for voltage or general industrial coding. *Continuous Lightweight exterior, pronounced "sealex"



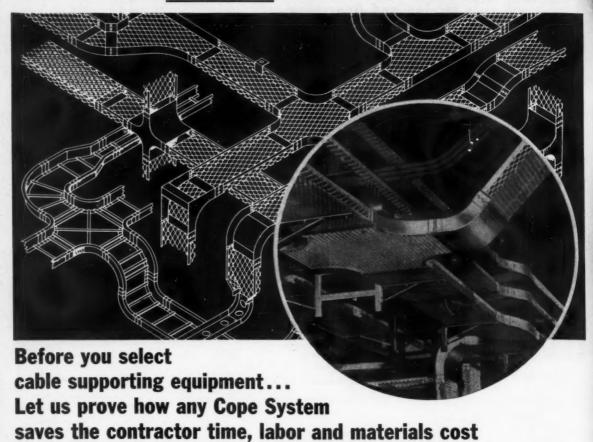
in Maintenance The reliability, safety and efficiency of any portable electric tool depends on the integrity of its cord or cable. Simplex-TIREX portable cords and cables are practically indestructible when used to do the work for which they are designed. TIREX portable cables are also cured and conditioned in lead.

Tirex Welding Cable

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Choose from-

EXPANDED METAL WIREWAY (Trough)

—for continuous support of power and control cables, instrument tubing. Supplied complete with all necessary system straight sections and fittings, couplers, accessories and hardware to meet every system layout requirement. No extras to buy with Cope Wireway! System straight sections and fittings designed in 6", 9", 12", 18" and 24" widths—straight sections in 8', 10' and 12' lengths. Exclusive Cope pin-type couplers speed assembly—require no special tools. Available in lightweight aluminum or hot dip galvanized steel construction.

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The comprehensive Cope catalog gives detailed specifications, load deflection and dimensional data on Cope Wireway, Channel, Ladder and Rakit System Supports and Accessories designed especially for use in installing Cope Cable Supporting Systems. Qualified Cope Engineers are prepared to give full assistance in system layout and design. Let us prove how Cope can help you make more money on your next installation. Contact your nearest Cope distributor . . . or write to T. J. Cope Division, Rome Cable Corporation, Collegeville, Pa.



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MICH ONE INESE BULLETINS OFFERED WORLD'S LARGEST EXCLUSIVE BALLAST MANUFACTURER IS MOST HELPFUL TO YOU?



I. BALLAST MANUAL

A new manual on Fluorescent Lamp Ballasts, completely illustrated, tells and about ballast circuits and about ballast circuits and scribes all phases installast manufacture, shows too and operation. Shows too and operation. Shows to test ballast current, trates a new easy-to-use trates a new eas



5. SERVICE-STOCKING DISTRIBUTORS' LIST

This bulletin completely describes the ADVANCE Nation-wide Not Completely Nation-wide Service Nation-wide Service Nation-wide National Nat





2. CROSS-REFERENCE

This guide lists all types of ADVANCE Ballasts, of ADVANCE Ballasts, of ADVANCE Ballasts, and the second street of the second se



6. WIRING DIAGRAM AND LEAD LENGTH BULLETIN

A new bulletin for users of Fluorescent Lamp Balliants gives all the lasts gives all the available specifications of available specifications of ADVANCE ballasts. A included are wiring described to the specific of the specific s ADVANCE ballasts.
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3. BUYER'S GUIDE

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Visa-Volt labelling is an exclusive Advance color coding for instant positive Fluorescent Lamp Ballast voltage identification.

ADVAN

Advan-guard, another Advan-guard, another Advance exclusive, is an Internal Thermally ac-tuated protective device that adds years to Bal-last life.



INDIVIDUAL PACKAGING



Individual packaging of Fluorescent Lamp Ballasts was introduced by Advance. These convenient cartons have an end label for instant identification, eliminate stocking problems and assure factory-fresh mer-chandise.



4. MERCURY VAPOR LAMP BALLASTS

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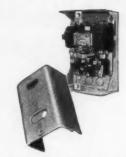
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Non-Adjustable Watertight Floor Box

Unique, practical design cuts installation time; makes safer job and leaves more wire space inside box. Overall height 3' and 31/4'.

Adjustable Watertight Floor Box

All "Latrobe Adjustable Watertight Floor Boxes are now equipped with a positive electrical bonding wire between the exposed flush parts which make them completely fireproof.

Adjustable **Gang Box**

"Latrobe" Adjustable Gang Floor Boxes with 31/2" square interchangeable brass cover plates are furnished in single gang, two gang, three gang and four gang types.



Nozzles

Nozzles for all types of Latrobe Watertight Floor Outlets - stem. bell, duplex telephone, duplex receptacle, and double duplex receptacle nozzles.



Floor Junction Boxes

Large variety with adjustable cover carried in stock. Standard sizes shipped immediately. Special sizes in about a week.



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For hanging pipe or conduit 1/2", 3/4" and 1" to steel beams up to 3/8" thick, at any angle.



Latrobe Pipe or Conduit Clamps

"Latrobe" Pipe or Conduit Clamps are made of highest quality malleable iron, cadmium plated to prevent rust with safety bite of case hardened tool steel.

Case hardened tool steel is inserted in one end of the Clamp-this is in the form of a V shape to give a double bite into the steel frame to which it is attached.

The Latrobe Clamps are made in two models-Right Angle Support and Parallel Support. Each comes in 10 sizes from 1/2 inch thru 4 inches.



Insulator Supports

Fasten porcelain or glass insulators to steel framework without punching holes. 4 sizes—1", 11/2", 2" and 21/2".



Keystone Fish Wire

Ten sizes-for lightest work to heaviest power wiring. 100, 150 and 200 foot coils.



"LATROBE"

Staples and Cable Clips For metallic and non-metallic covered cable. Packed in cartons, kegs and barrels.



A round wire staple with flat head comes in 2 sizes-1/2" x 1" and also 5/8" x 11/4". Packed in cartons, kegs and barrels.

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COLLYER covers the nation to meet your complete wire and cable needs!



VARNISHED CAMBRIC INSULATED Types VCB, VCL, Interlocked Armored



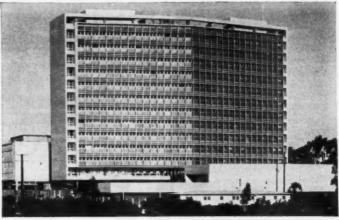
RR POWER CABLES - 600 to 8000 volts Types RR-USE, RR-DUCT, Silicone Insulated





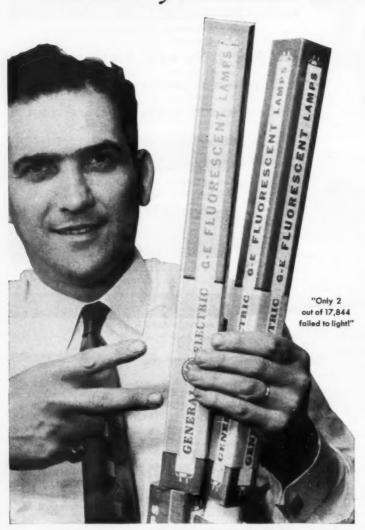
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"We buy fluorescent lighting on cost



PEREIRA & LUCKMAN, ARCHITECTS

-that's why we use General Electric Lamps!"



"General Electric says one out of a thousand G-E Lamps may not light", comments Mr. Hack Lazerson (at left) of Solar Light Manufacturing Company in Los Angeles. "How come they're so modest?

"We provided 17,844 General Electric Lamps for the new Union Oil Company building. They were delivered to us; we installed them in our fixtures and then trucked them to the job. In routine assembly and testing, only two of the lamps which were installed failed to light.

"We've known all along, too, that G-E Lamps are practically maintenance free. Because, on the average, 99 out of 100 will still be burning after almost 2-years' use!"

For your customers who buy fluorescent lamps, such reliability is measurable in extra value, extra savings. They'll spend less on lighting if they pay less attention to the purchase price of the lamps, which is only 10% of the total cost of lighting anyhow, and more to lamp performance. They'll spend fewer manhours removing, storing and returning the faulty lamps.

Your customers should buy lighting on cost-but point out that cost includes everything which affects their cost of light. And G-E Lamps are their best lighting value.

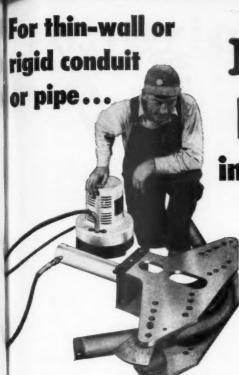
Call your local G-E Lamp Representative for the whole story-or write: General Electric Co., Large Lamp Department, C-838, Nela Park, Cleveland 12, Ohio.



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G-E LAMPS GIVE YOU MORE VALUE FOR ALL YOUR LIGHTING COSTS



BLACKHAWK PIPE BENDERS

in every size and price range!

You look ahead to amazing savings when you look over the world's most complete line of pipe benders . . . yours from Blackhawk. First choice with electricians everywhere! Exclusive advanced designs do the hard work for you . . . pay for themselves in 2 or 3 jobs! Be prepared to save up to 77% over cost of manufactured ells.

New super-portable featherweight aluminum models are easiest to set-up! Make bends in 3" pipe in just one bite! Turn out neater, more accurate jobs in half of the time. required by ordinary benders.

Check this chart now. Then select the Blackhawk that is just right for you.

MODEL	PUMP	DIAMETERS
S-30A	Hyd. hand pump	1, $1\frac{1}{4}$, $1\frac{1}{2}$, and $2^{\prime\prime}$ rigid conduit and pipe
5-34	Hyd. hand pump	11/4, 11/2, 2" thin-wall conduit
5-36	Hyd. hand pump	$1\frac{1}{4}$, $1\frac{1}{2}$, 2 , $2\frac{1}{2}$, 3 , $3\frac{1}{2}$; $4^{\prime\prime}$ rigid conduit and pipe
New 5-130 1-bite	Hyd. hand pump	1/2 - 2" rigid conduit and pipe
New 5-132 1-bite	Electric-powered pump	1/z - 2" rigid conduit and pipe
New 5-137	Hyd. hand pump	$1\frac{1}{4}$, $1\frac{1}{2}$, 2 , $2\frac{1}{2}$, 3 , $3\frac{1}{2}$, 4^{tr} rigid conduit and pipe
New S-138 1-bite	Hyd. hand pump	11/4, 11/2, 2, 21/2, 3" rigid conduit and pipe
New 5-139 1-bite	Electric-powered pump	$1{1/\!\!/_{\! 4}},1{1/\!\!/_{\! 2}},2,2{1/\!\!/_{\! 2}},3''$ rigid conduit and pipe
New S-140	Electric-powered pump	$11\!/_{\!4},11\!/_{\!2},2,21\!/_{\!2},3,31\!/_{\!2},4^{\prime\prime}$ rigid conduit and pipe

benders slash costs 77%!

One bite does it! NEW Blackhawk aluminum



NEW S-130 FEATHERWEIGHT ALUMI-NUM BENDER for ½ to 2" pipe and rigid conduit—make full 90° bends in just one operation! Speeds mak-ing 180° bends, double offsets and compound bends. Cuts bending time in half! See for yourself! Try one on your next job.



NEW S-140 FEATHERWEIGHT ALUMINUM BENDER for up to 4" pipe — Electric power operated. A cinch for one man to assemble and carry right to the job Bends up to 3" rigid conduit in one lightning past Only 3 quick setups are needed for 3½ and 4" 90° pipe bends.







WHOPPING 77% SAVED ON WHOPPING 77% SAVED ON BENDS! Dietz Electric Co., project foreman says, "Last job, we saved more than \$2,000 compared to manufactured ells. From now on, Blackhowk 5-139 is our production bender." Try Blackhowk . . , the fastest bender on the market today.

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mounted right on bending
shoe to give exact degre
shoe to give exact degre
et bend during bending opeetation. Gone are gueswork, time-wasting measuring for determining correct
degree of bends!

EXCLUSIVE "OPTIK-ANGLE"

BLACKHAWK bends prove BLACKHAWK'S best!



SEE YOUR DISTRIBUTOR

. . . choose from his complete Blackhawk stock!



Blackhawk Mfg. Co., Dept. P-7098, Milwaukee 46, Wis.



WIRING TOOLS **CUT COSTS!**

Get exactly the tools you need - when you need them. It's fast and economical to specify IDEAL - one dependable source for everything in electricians tools. Shown here are just a few items from the complete IDEAL line.



Voltage Tester 2-Ways Safe



The Voltage Tester has both a solenoid, calibrated indicator and a neon test lamp — each inde-pendent of the other. Can't fail to detect voltage. Handy center mount for the prod keeps the indicator al-ways in the line of vision. Tests 110 to 550 volts AC — 110 to 600 volts DC.

Write for bulletin No. L-2E



"E-Z" Stripper for UF Cable

"E-Z" UF cable stripper strips the outer sheaths and web, then the inner conductors (2 or 3 wire, 12 or 14 ga.) from non-metallic sheathed cable. No cutting, nicking, or other damage to wire ends.

Write for bulletin No. N-1F



Deluxe Cable Ripper Fast - Built to Last

The Deluxe Cable Ripper quickly and easily rips the

outer sheaths from non-metallic, covered cable up to ½" O.D. Cable is inserted into cradle of the tool from the side—no time lost threading it into cutters, etc. Rigid frame and cradle insure straight cut. Steel cutting blade is replaceable

Write for bulletin No. N-1F



Low Cost T-5 Wire Stripper For 10-18 Gauge

Strips wires cleanly. quickly, and easily. Also used for cutting and "looping" wires. Contoured plastic grips for easy handling and safety. Overall size 6". Flat design for easy

Write for bulletin No. N-1F



Safe - easy to use. No danger of flashover with high voltages — actually withstands 8000 volt dielectric air gap tests. Easy to change circuits - just unscrew and reuse the same connector. 600 volt approval as pressure cable connectors. For all usual wire combinations.

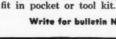
Write for bulletin J-3A



Every wiring job is easier when you make

witer-yournesses pigtail splices with IDEAL "Wire-Nuts". Just screw them on like a nut on a bolt. Only "Wire-Nuts" give a wire crushing grip. Approved for 600 volts as pressure cable connectors. For all usual wire combinations.

Write for bulletin J-1E



(IDEAL) CRIMP CONNECTOR with Wrap Cap'

Gives greater holding power than any other crimp connec tor used for pigtail splices. Sleeve is open at both ends to

permit visual observation to be sure all wires are properly in place. Gives vibration-proof joints and has low electrical resistance 600 volt approval as pressure cable connectors for common wire combinations from No. 14 through No. 10.

Write for bulletin No. J-5



Wire Lube Saves Wire **Pulling Time**

Wire Lube, a special formula cream, lets you slide wires in or out of conduit easier. It dries to a fine powder and is noncombustible, non-corrosive. Use on rubber, lead, or plastic covered wire and cable. Available in 1 quart cans to 5 gal. pails.

Write for bulletin No. L-1F

IDEAL

Fish Tape Reels and Pullers -All In One

A safe, easy way to handle long conduit runs. Reel gives real pulling power to keep tape under control. Hands are protected. Five sizes, 50 to 200 foot lengths.

Write for bulletin No. L-1F

(DEAL) Combination **Fuse Puller** and Test-Lite

This new tool gives maximum safety in pulling cartridgetype fuses and in

checking electrical connections. Suregrip dielectric plastic handler speed fuse pulling. Positive testing is assured by built-in resistors which limit current flow through the tester. Test capacity 100 to 600 volts AC or DC. Designed for use on fuses up to 100 amp, 250 volts and 60 amp, 600 volts.

Write for bulletin No. L-2E

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COLOR STABILITY



INTERLOCKING

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LOW SURFACE BRIGHTNESS



HIGH ILLUMINATION VALUE



IDEAL SHIELDING



LIGHTER WEIGHT



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SAFE FOR

OUTSTANDING

LOUVER

any lighting design

Available in combination of sizes and subject to modifications.

American Plastic Louvers offer the maximum in conformability for any lighting plan, whether it be industrial, institutional, commercial or retail. In application they may be employed in individual fixtures, full ceiling installations or any modular pattern.

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Canadian Pat. No. 484,346 Canadian Pat. No. 497,047

american plastic louvers **Formulation**

MECHANICAL	
Tensile Strength	
Elongation at Break	
Modulus of Elasticity	
Hardness	
Flexural Strength	
Deflection at Break	

reflection at Break npmct Strength 1/2" x 1/2" Notched 1/2" x 1/4" Gate End Notched 1/2" x 1/4" Dead End Notched

Thermal Expansion Heat Distortion

Deformation Under Load

OPTICAL

Light Transmission #1040 Pigmentation 0.050° thick 0.100° thick 0.150° thick

Specific Gravity
Moisture Absorption
Burning Rate (0.050" thick)

ELECTRICAL

Dissipation Factor Dielectric Constant Dielectric Strength Volume Resistivity

bs. per sq.in

Percent In tension lbs./sq.in Rockwell Lbs. per sq in Inches

Percent Transmission @550 mu

Percent In./min

10° cycles Volts/Mil, 1/8" thick Ohm/cm

0001-0005

1.04-1.06

HF 77-1040

6500-8000 1.8-2.4 4-5 x 10° M70-80 9000-13,000 0 15-0.35

0.25-0.35 0.60-0.70 0.30-0.40

6-8 x 10 1 183-191 0.8-1 0

ASTM

D638-52T D638-52T D638-52T D785-51 D790-49T D790-49T

D256-47T D256-47T D256-47T

D696-44 D648-45T D621-51 D621-51

D150-47T D150-47T D149-44 D257-52T

The above data represent average values determined on virgin molding powder under appro-priate A.S.T.M. tests conducted in the present range of Lustrex Permatone* colors, formulations

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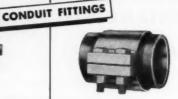
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CABLE SUPPORTS



CABLE SUPPORTS
SPLIT TYPE



SPLIT



EXPANSION FITTINGS



INSULATED BUSHINGS



BAKELITE



EXPLOSION-PROOF TYPE



WEATHERTIGHT SUBMERSIBLE TYPE



TERMINATING POTHEADS



SEALING BUSHINGS





TERMINATORS



SPLICING FITTINGS



COMBINATION



COMBINATION TWO-WAY CONNECTORS



SERVICE TAP



COMBINATION TEE AND PARALLEL CONNECTORS

POWER CONNECTORS



T-CONNECTORS, TUBE TO MULTIPLE CABLE TYPE



CLAMPS

GROUND CONNECTORS

CABLE TO PIPE OR ROD 90° OR PARALLEL



CABLE TO FLAT BAR

They're O. K. if They're O. Z.



CRESCENT



Insulated Wires and Cables

Pictured and described here are just a few of the many wires and cables that are made by CRESCENT.



ABC ARMORED CABLE

Has prefabricated breaking lines which make installing easier, quicker and safer. A flattened bonding wire in contact with the underside of each convolution of the armor assures a permanent low resistance of armor.



SYNTHOL BUILDING WIRE - TYPE TW

For both wet and dry locations. Insulated with a special, tough thermoplastic compound. High dielectric and mechanical strength. Smallest outside diameter for same conductor size permits more or larger conductors in same space.



ENDURITE BUILDING WIRE — TYPE RH-RW

A dual purpose wire, for either dry or wet locations. Type RH has a greater carrying capacity because of higher permissible operating temperature, which allows use of smaller size cable at less cost.



IMPERVEX TRENCHWIRE - TYPE USE-RR

Single conductors for direct earth burial. Has a heavy Neuprene Jacket over the rubber insulation. Provides low cost, permanent underground cable installation.



STEEL TAPED PARKWAY CABLE

Designed for direct earth installation without additional protection. All standard types regularly supplied and special type cables made to customers' specifications.



IMPERIAL PORTABLE POWER CABLE

illustration shows Type SH-D 5000 Volt Trailing Cable for supplying power to electric shovels, dredges, etc. Covered with extremely tough Nooprene jacket.

13/3 CRESCENT - TYPE UF - 12/3 CRESCENT

TYPE UF AND TYPE NMC

Used for direct earth burial as an underground feeder, also used for branch circuit wiring in damp or corrosive locations.



BUILDING WIRE - TYPE RHW

Braid or Neoprene covered
Highest quality insulation, for use in both WET and DRY
locations 75° C.



CRESFLEX

Most suitable, lowest cost for rural, residential and farm buildings. Clean, gray paint finish.



SERVICE CABLES - TYPE SE

Both Style A (armored) and Style U (unarmored) are approved by Underwriters' Laboratories as service entrance cable and may be run down the side of a building without additional protection. It is tamper-proof, flexible and lightweight, moisture-resistant and flame-retarding.



NEOPRENE CRESCORD

Heavy duty, oil-proof portable cord, Underwriters' Laboratories Type 80.



INTERLOCKED ARMOR POWER CABLE

Provides a flexible, metal-enclosed method of wiring for



VARNISHED CAMBRIC LEAD ENCASED CABLE

Varnished cambric insulation has high dielectric strength and long life. Not affected by oils and greases. This cable is sup-plied with lead sheath for wet locations or weatherproof braid for dry locations.

CRESCENT INSULATED WIRE & CABLE CO.

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IN FEATURES!

TUNGSTEN RATED* (most models) . . . NEW ALLOY-T CONTACTS . . . U-BEAM BLADES . . . HI POWER SWITCHING MECHANISM . . . E-Z-SEE DIAL . . and many others!

IN DEPENDABILITY!

Fast, positive make and break action is assured with new contacts, blades and hi-power switching mechanism—welding, arcing, and pitting are virtually eliminated! Money is saved because of fewer call backs! Heavy duty motor for long life and quiet operation!

IN EASE OF INSTALLATION AND SERVICE!

SNAP-OUT MECHANISM ... 31 CUBIC INCHES OF WIRING ROOM ... TWO DIRECTION TIME DIAL ... EASILY RE-SET, ADDED, OR REMOVED TRIPPERS . . . these are some of the reasons for Intermatic's money and time saving reputation!

T RATED can carry incandes cent lighting loads with an inrust surge of more than 8 TIMES their carry appearance rating



CHOOSE THE INTERMATIC TIME SWITCH EXACTLY SUITED TO YOUR TIMING, OPERATION . . . FOR INDUSTRIAL, COMMERCIAL, RESIDENTIAL, AND FARM APPLICATIONS!

SERIES	OPERATION	SERIES	OPERATION
1100	Standard ON-OFF1 to 11 ON-OFF operations a day, timings from 1 to 23 hours. 35 ampere T-Rating.	T1100	The famous LAMP+LYTER, providing homes with the luxury and convenience of automatic lighting control! For automatic ON-OFF operation of lights, lamps, post lanterns, etc. LAMP+LYTERS also mean safety and protection for homes.
T170	"Skipper" switch skips operation automatic- ally on Saturdays, Sundays, holidays, or other selected days. T-Rated 35 amperes.	V21000	A full week can be pre-set, with ON-OFF opera- tions as close as 2 hours Operation on selected days can be skipped if desired.
T180	Up to 12 ON-OFF cycles a day, with each cycle independently adjustable from 5 to 60 minutes. T-Rated 35 amperes.	V22000	Controls two electric circuits at different times. Timing range is 30 minutes to 23½ hours. Different models provide choice of switching sequence.
T960	For 1 to 96 ON-OFF operations every 24 hours, in 15 minute increments. Trippers are permanently attached, easily slide in and out of dial.	V27000	Extremely accurate ON-OFF operations in multiples of 5 or 15 minute periods on a 24 hour basis.
C8300	Twelve minute cycler 1-12 ON-OFF operations within 12 minute period. ON operations from 10 seconds to 11 minutes, 10 seconds; OFF operations from 50 seconds to 11 minutes, 50 seconds.	V28000 and V29000	For 1 to 288 daily bell ringing operations of 2-60 second duration Signals in multiples of 2½, 5, or 15 minutes.
T500	Up to 12 ON-OFF operations a day Heavy duty will handle up to 27,500 watts of tungsten filament (incandescent) lamp loads or motor loads up to 2 hp. T-Rated 55 amperes.	CASES Besidet the standard case, internatic offers the following for special installations:	RAINTIGHT CASE

WRITE FOR CATALOG 98-84 DESCRIBING COMPLETE LINE OF INTERMATIC TIME SWITCHES ... YOU CAN Depend ON INTERMATIC

INTERNATIONAL REGISTER COMPANY

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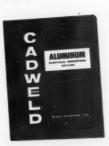
NOW - CADWELD Electrical Connections for Aluminum

Latest news in the electrical industry is ERICO PRODUCTS, INC.'S new thermit type welded aluminum connection. Similar to their copper CADWELD PROCESS, NEW connections can be made on aluminum cable to: cable, lug, bus, surface or tube; bus to bus and bus to lug or tube. Also available are transition joints of aluminum to copper.

The new CADWELD Aluminum Process is a controlled exothermic reaction—a reduction of tin oxide by aluminum forming a tin-aluminum alloy. The reaction takes place in a machined graphite block, housing the aluminum conductors to be welded. The powder (A-22) becomes molten on igniting and flows over the aluminum (or aluminum to copper) conductors fusing them into a solid homogeneous mass.

Outside laboratory tests have proved the connections to be excellent electrically and good physically. Tensile strength is equal to that of the annealed conductor. By designed increase in connection cross sectional area, CADWELD Aluminum Connections have a 97% to 100% conductivity of the base metal. Extreme portability of equipment (requiring no outside source of power or heat) gives the customer the Number One aluminum electrical connection that does not loosen or corrode.

New catalog gives technical, instructional and ordering information on over 30 basic type connections. With the growing acceptance of aluminum as an electrical conductor, CADWELD ALUMINUM CONNECTIONS now solve the most difficult problem—a high quality electrical connection.



NEW CATALOG on Letterhead Request

ERICO PRODUCTS, INC. 2070 E. 61st Place Cleveland 3, Ohio



CADWELD electrical connections have 5 basic outstanding features:

- Permanent cannot loosen or corrode.
- 2. 100% current carrying capacity.
- 3. Compact easily installed.
- 4. Light weight equipment.
- Portable equipment requires no outside source of power or heat.

BESIDES THESE FEATURES IS A SIXTH MAJOR POINT THAT OUTSELLS ALL FIVE — VERSATILITY

Once any customer has made a CAD-WELD electrical connection he knows the process. From that point, the only change is in the individual mold design. Todays catalog, lists over 58 basic types of connections — one year ago, there were only 32. The specials have become standards, because our customers approve the high quality of CADWELD and request it on new applications every day.

Send in your special electrical connection, it will be a standard CADWELD connection tomorrow.



MULTIPLE TAP CABLE TEE



CRANE RAIL POWER FEEDER



MULTIPLE CABLE TERMINATION



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Erico Products, Inc.

2070 E. 61st Place

Cleveland 3, Ohio

IN CANADA: ERICO INCORPORATED, 3571 Dundas St., West, Toronto 9, Ontario

SPECIFICATION GRADE

SILENT MERCURY



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New Sierra-lite Mercury Switches, with lighted toggle that glows in the dark, available in single pole, 5005; and three-way 5006.









	125V. "T"	250V.	125V. AC
RATINGS	10 AMP.	5 AMP.	15 AMP.

	DESCRIPTION		BROWN
SPECIFICATION	Single Pole	5001	5001X
GRADE	Double Pole	5002	5002X
	Three-Way	5003	5003X
	Four-Way	5004	5004X

SIERRAPLEX

SIERRAPLEX is a registered trade name for a new line of distinctively designed receptacles. Clean and modern, they complement any decor-and are built only to the exacting Specification Grade standards, your visual proof that only the finest has been installed.

















DESCRIPTION		EL SLOTS 125V		M SLOTS
BACK AND SIDE WIRED	IVORY	BROWN	IVORY	BROWN
Single Grounding-Type 3-wire	1600	1600X	1601	1601X
Duplex Grounding-Type 3-wire	1800	1800X	1801	1801X
Duplex Grounding-Type Comb. 2- and	3-wire, 15A	125V-250V	1850	1850X
Single Convenience 2-wire	1500	1500X	1501	1501X
Duplex Convenience 2-wire	1700	1700X	1701	1701X
SIDE WIRED	192	E. A.	9	300
Single Grounding-Type 3-wire	1602	1602X	1603	1603X
Duplex Grounding-Type 3-wire	1802	1802X	1803	1803X
Duplex Grounding-Type Comb. 2- and	3-wire, 15A	125V-250V	1852	1852X
Single Convenience 2-wire	1502	1502X	1503	1503X
Duplex Convenience 2-wire	1702	1702X	1703	1703X
Triplex—Single Circuit	1900	1900X	-	1
Triplex-2 Feeds-1 Return	1901	1901X	15.20	(4.20)
Triplex-2 Feeds-2 Returns	1902	1902X	- 26	
	-		1	
BACK AND SIDE WIRED	1000		PARTY OF	100

SIERRA

SIERRA receptacles offer the same high quality and craftsmanship as the Sierraplex line. All are Specification Grade, with smooth conventional styling.













1	Triplex—2 Feeds—2 Returns	1902	1902X		-	
1	BACK AND SIDE WIRED	-				
	Single Grounding-Type 3-wire	1200	1200X	1201	1201X	
	Duplex Grounding-Type 3-wire	1400	1400X	1401	1401X	
	Duplex Grounding-Type Comb. 2- and	3-wire, 15A	25V-250V	1450	1450X	
- BUILD	Single Convenience 2-wire	1100	1100X	1101	1101X	į
	Duplex Convenience 2-wire	1300	1300X	1301	1301X	
0000	SIDE WIRED	0.2033				
	Single Grounding-Type 3-wire	1202	1202X	1203	1203X	
	Duplex Grounding-Type 3-wire	1402	1402X	1403	1403X	
į	Duplex Grounding-Type Comb. 2- and	3-wire, 15A	125V-250V	1452	1452X	
ĵ	Single Convenience 2-wire	1102	1102X	1103	1103X	
ĺ	Duplex Convenience 2-wire	1302	1302X	1303	1303X	
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"P" LINE

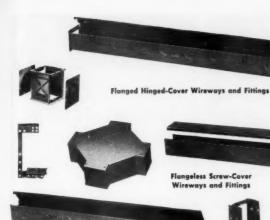


STAINLESS STEEL "S" LINE

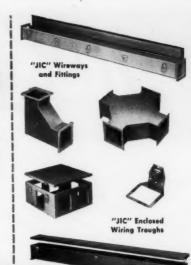


SIERRA ELECTRIC CORPORATION

P.O. BOX 88 - GARDENA, CALIFORNIA









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Whether you're a distributor, contractor, end user—or an original equipment manufacturer, you'll find that Keystone offers you a complete line of quality wiring installation equipment designed to meet your exact needs. U.L. listed wireways and auxiliary

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installation.

HUSKY CABLE RACKS

USE: Support of multiple power and/or control cables.

DESCRIPTION: All-welded construction. Cross rungs on 18 inch centers. Furnished in two (2) depths for 12 or 20 foot spans. Lengths up to 24 feet.

HUSKY CABLE TROUGHS

USE: Support of individual power and/or several control cables.

DESCRIPTION: One piece construction. Lengths up to 16 feet.

HUSKY CABLE BASKETS

USE: Where continuous bottom is required for support of multiple control cables. DESCRIPTION: Continuous expanded metal or solid bottoms set on cross vakes. Furnished in several depths. Lengths up to 16 feet.

HUSKY CABLE TRAYS

USE: Support of multiple control cables where continuous bottom is NOT required. DESCRIPTION: All-welded construction. Cross rungs on 9 inch centers. Lengths up to 24 feet.

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Auxiliary to the basic cable carrier types Husky Products offer a wide range of accessory materials which include:

- A. Component parts for cable carrier support assemblies.
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ALL Cable Manufacturers

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- General Electric Co.,
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- · National Electric Products Corp.
- . The Okonite Co.
- Rockbestos Products Corp.
- Simplex Wire & Cable Co.
- Tennessee Coal & Iron Division (U. S. Steel Corp.)

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Shown is the unflanged surface type with pads and lugs. Also available are the flanged surface type, recessed-cover type for flush mounting, hinged-cover type for surface mounting and explosion-proof design. All are available in a wide range of standard and special sizes.

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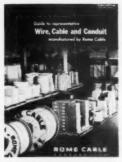
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ROME CABLE

CORPORATION



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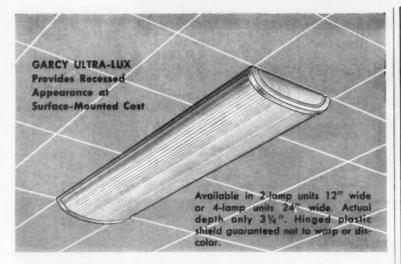
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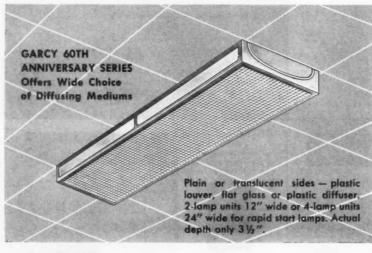
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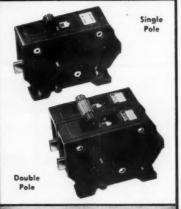
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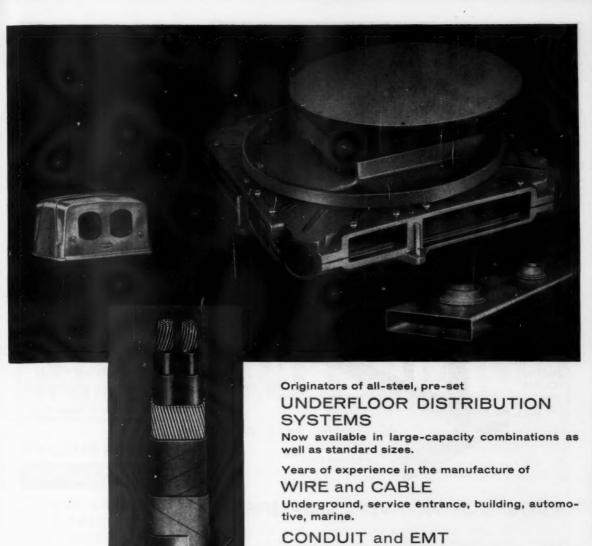
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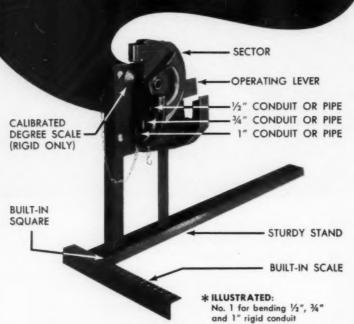
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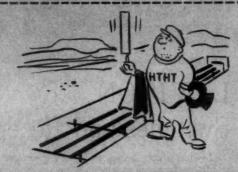
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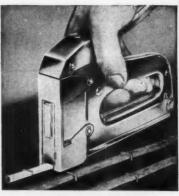
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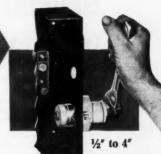
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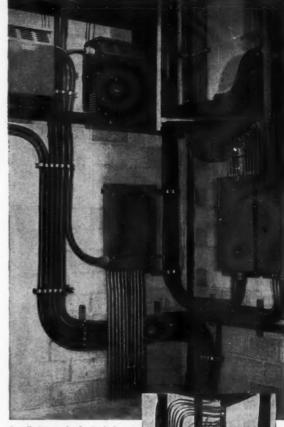
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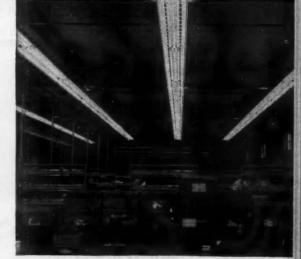
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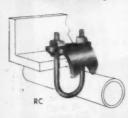


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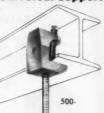
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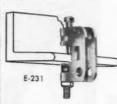
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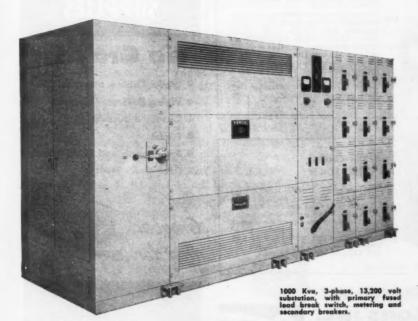
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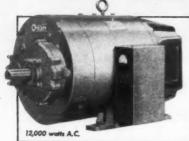
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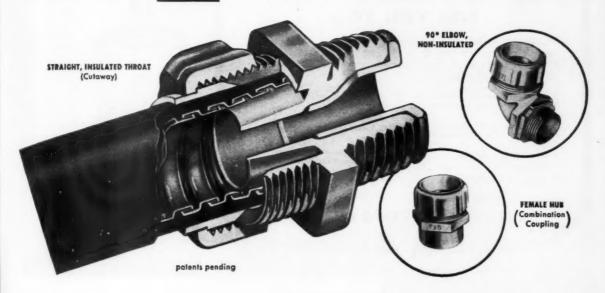
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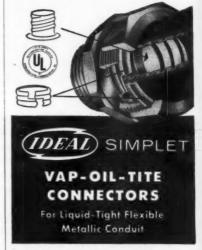
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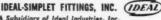


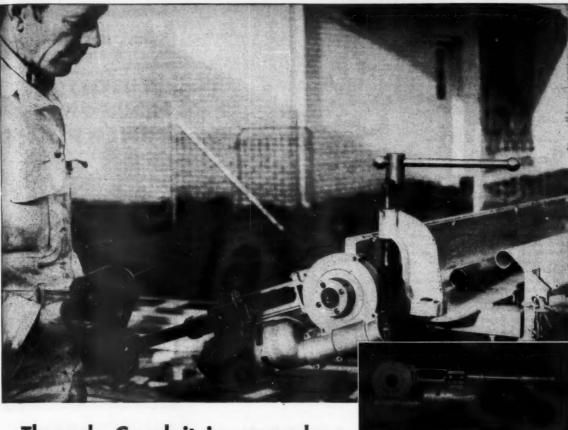


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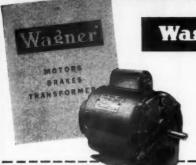
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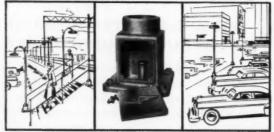
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gized. Available in dual-voltage (115-230 volt) from 1/2 to 2 hp.
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BULLETIN #25

YOUNGSTOWN BUCKEYE CONDUIT



HOT GALVANIZED:

High quality steel pipe is first, thoroughly cleaned by pickling in acid, then immersed in a beth of molten pure zinc. After threading, a coating of tough, transparent enamel is baked on —providing double corrosion protection of zinc and enamel —inside and out.



ELECTRO GALVANIZED:
After being threaded, reamed

and carefully inspected, this conduit is cleaned by pickling.

then uniformly coated outside

with zinc. A coat of tough,

elastic black enamel is then

baked on the interior, provid-

ing protection as well as a

smooth raceway for trouble-

BLACK ENAMELED:

A protection, black enamel coating is applied inside and out by dipping. When a uniform thickness of this coating has been achieved, it is then baked to form a tight, elastic, high lustre finish—guarding against cracking in bending or forming operations during installation.

TUBING: Absolute uniformity of weight, wall thickness and concentricity, plus protective outside coating of pure zinc and baked-on elastic enamel interior, forms this modern mirrorsmooth raceway. Lightweight, easy to handle, no threads to cut, bends readily and assures safe, economical, life-time electrical installations.

ELECTRICAL METALLIC

Yes, Youngstown Buckeye Conduit has been proven through the years by thousands of owners and by leading Electrical Contractors the world over . . . proven that it is easy to bend . . . easy to fish wires through . . and economical due to greater corrosion resistance that means longer, trouble-free life in actual service. Youngstown Buckeye Conduit has also proven that it pays dividends through lower installation costs and greater efficiency. Add to these many features the fact that Youngstown Buckeye Conduit is manufactured "from iron ore to the finished product" by ONE integrated steel company and you know why it is preferred by so many.

ProveN - YEARS THROUGH THE YEARS

Sise		Diameter hes) External	Nominal Wall Thickness (Inches)	Threads Per Inch	Feet Per Bundle
1/2	.622	.840	.109	14	100
3/4	.824	1.050	.113	14	50
1	1.049	1.315	.133	111/2	50
11/4	1.380	1.660	.140	111/2	30
11/2	1.610	1.900	.145	111/2	30
2	2.067	2.375	.154	111/2	
21/2	2.469	2.875	.203	8	
3	3.068	3.500	.216	8	
31/2	3.548	4.000	.226	8	
4	4.026	4.500	.237	8	
5	5.047	5.563	.258	8	
6	6.065	6.625	.280	8	

Conduit furnished in 10-foot lengths, threaded both ends with one coupling.

COUPLINGS

Size	Outside Diameter (Inches)	Length (Inches)	Pieces Per Carton
1/2	1.063	1.562	100
3/4	1.313	1.625	50
1	1.576	2.000	50
1 1/4	1.900	2.062	50
1 1/2	2.200	2.062	50
2	2.750	2.125	25
21/2	3.250	3.125	
3	4.000	3.250	
31/2	4.625	3.375	
4	5.000	3.500	
5	6.296	3.750	
6	7.390	4.000	

ELBOWS

Radius (Inches)	Offset (Inches)	Pieces Per Carton
4.000	6.500	50
4.500	7.250	50
5.750	8.750	25
7.250	10.500	20
8.250	11.750	15
9.500	13.500	10
10.500	15.000	
13.000	18.000	
15.000	20.500	
16.000	22.000	
24.000	31.000	
30.000	37.500	
	(Inches) 4.000 4.500 5.750 7.250 8.250 9.500 10.500 13.000 15.000 16.000 24.000	(Inches) (Inches) 4.000 6.500 4.500 7.250 5.750 8.750 7.250 10.500 8.250 11.750 9.500 13.500 10.500 15.000 13.000 18.000 15.000 20.500 16.000 22.000 24.000 31.000

ELECTRICAL METALLIC TUBING

		l Diameter iches)	Nominal Wall Thickner	s Feet
Size	Internal	External	(Inches)	Per Bundle
1/2	.622	.706	.042	100
3/4	.824	.922	.049	100
1	1.049	1.163	.057	100
1 1/4	1.380	1.510	.065	50
11/2	1.610	1.740	.065	50
2	2.067	2.197	.065	30
EMT	furnished in	10-foot le	ngths, witho	out

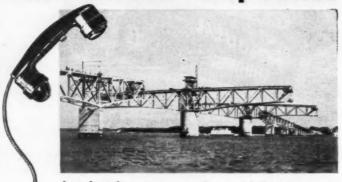
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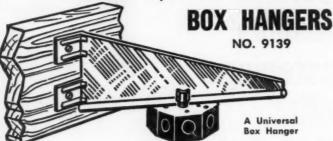
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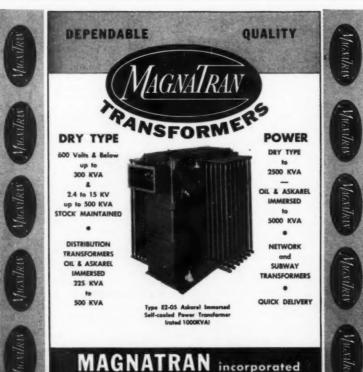
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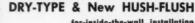


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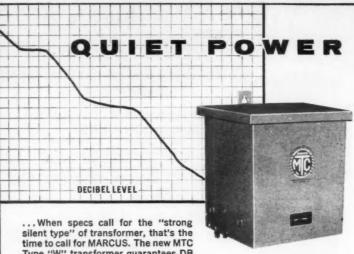
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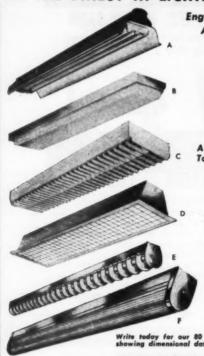


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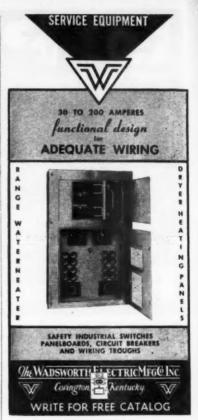
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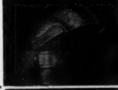
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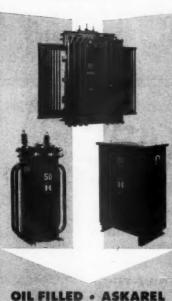
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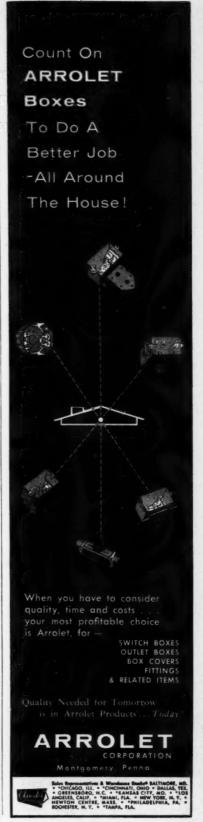
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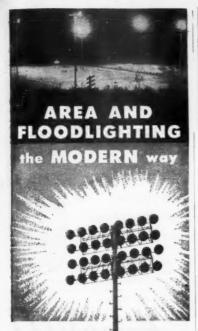
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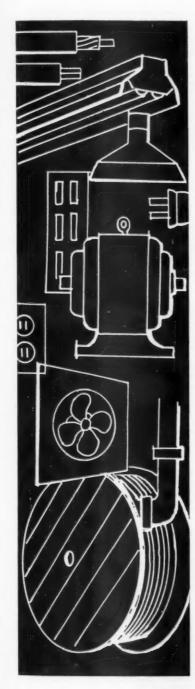
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PRODUCT DIRECTORY



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Classified listings of manufacturers of electrical products

Products in this section are arranged under the following 12 major sections:

- 1. Power Transmission Line Equipment
- 2. Transformation & Conversion Eqpt.
- 3. Switching & Control Equipment
- 4. Protective Equipment 5. Wiring Devices & Boxes
- 6. Conductors & Connectors
- 7. Raceway
- 8. Motors & Generators
- 9. Lighting Equipment
- Signal, Communication & Indicating Eqpt.
- 11. Heating & Cooling Equipment
- 12. Tools & Supplies

Each of these sections is further broken down into individual classes of equipment. For example: Section 1, "Power Transmission Line Equipment", includes (A) CONDUCTOR SUPPORTING STRUCTURES, (B) LINE TRUCKS & MOBILE EQUIPMENT, (C) MANHOLE EQUIPMENT, and (D) POLE EQUIPMENT.

Where applicable, these classes are further subdivided. CON-DUCTOR SUPPORTING STRUCTURES, for instance, include (1) Crossarms, (2) Poles, and (3) Towers. Companies manufacturing crossarms would be followed by a (1) in parentheses; those manufacturing poles would be followed by a (2); those manufacturing both would be followed by (1-2), etc.

The symbol (•) indicates that detailed information concerning the product may be found on the page indicated after the listing.

PRODUCT INDEX

Manufacturers of equipment and materials normally used in electrical construction, plant operations and motor service work are listed in the Product Directory beginning on page 184. To find any specific product in this directory, locate the product first in the comprehensive alphabetical index below.

For example, this index shows "Cartridge fuses" to be listed under 4B. Using the handy edge index on the front cover, turn to Section 4 and find "Cartridge fuses" as number 1 under "4B. Fuses". Companies listed under "Fuses" which are followed by the bracketed number (1) make cartridge fuses.

Adapters, conduit bushing. Adapters, grounding Adapters, socket Air conditioners Air gap gauges. Air handling equipment Aircraft motors Airport cable Airport cable Airport cable Airport lighting Alarms, burglar Alarms, burglar Alarms, fre Alloy conduit Alarms, fre Alloy conduit Alternators Alternators Alternators Alternators Antennators Ammeters Amplifiers, magnetic Anchors, earth Anchors, earth Anchors, poie line Anchors, wall Annunciators Antenna systems Appliance switches Appliance wire & cable Arbor presses Are lamps Are lamps Are lamps Armature banders Armature banders Armature banders Armature banders Armature fields Armature fields Armature fields Armature fields Armature fields Armature fields Armature holders & stands Armature shelps, multi-outlet Attachment caps & bases Autostarters Autotransformers Autoflary gutters		Bipost sockets Blanks, knockout Blanks, knockout Blanks, knockout Blocks, cable-pulling Blocks, connecting Blocks, connecting Blocks, connecting Blocks, terminal Blocks, terminal Blocks, conduit TE Blowers, portable 12J Blown fuse slarms 10B Blodies, conduit TE Bodies, conduit TE Bodies, conduit TE Bodies, conduit TE Bodies, steam (electric) 11C Bollers, steam (electric) 11C Bollers, steam (electric) 12K Boits, toggle 12K Boits, toggle 12K Borers, earth 1B Boring tools, hand 12J Boundary alarms 10D Flox hardware 5E Box-to-conduit connectors TE Box-to-conduit connectors TE Boxes, wiring Boxes, wiring Boxes, wiring Brackets, wall lighting Arake motors Brackets, wall lighting Arake motors Brackets, wall lighting Arake motors Brackers, circuit Brackers, circuit Herwerry cable Bridge cable GD Bridge lamps GG Bruah holders 12M Buckets, tool Busbar agners GG Bunlang alarms GG Bunlang alarms GG Bunlang, conductor supporting GG Bushings, conductor supporting GG Bushings, conductor supporting GG Bushings, conductor supporting GG Bushings, conductor supporting Busway TB Busway TB	Cement, insulating 12U Cement, insulating 12U Central furnaces, electric 11A Centrifugal switches 3H Central furnaces, electric 11A Central furnaces, electric 11A Centrifugal switches 3H Changers, lamp 123 Channel, cable-supporting 6G Charging controls, battery 2F Chemical wire stripper 12F Cheeks, coll 12F Chemical wire stripper 12F Chemical wire stripper 12F Chemical wire stripper 12F Chemical maiyzers 10A Circuit breaker cabinets 10A Circuit breaker cabinets 10A Circuit breaker testers 10A Circuit breaker 10A Circuit
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Armatures	.12M	Bushar & supports	Colled cords
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Asbestos tane	128	Bushings, conduit	Collecting rings & shoes
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Autotransformers	2A,2B		Compensators, motor3M
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R		Cabinets, equipment enclosing	Compound, impregnating12P
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Battery accessories	2G	Calling systems	Connecting blocks
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Bearing installers & estructure	6G	Capacitors, power-factor correcting3P	Contactors magnetic 3M
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			Control switches
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Dust-tight lighting fixtures. 9C Dynamic balancers 12E	Furnaces cable	Industrial lift trucks. 12D Industrial lighting. 9C
Dynamic balancers 12E Dynamometers 10A Dynamos 8G Dynamotors 8G	Fuse cabinets	Industrial igning. sg. Industrial television. 10P Infrared heaters. 11C Infrared lamps. 9G Insect-repellent lamps. 12K Inserts. concrete. 12K Instrument motors. 12J Institutional lighting 12J Instrument motors. 8D
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E		Institutional lighting9C Instrument motors
EMT Earth boring trucks. 1B Edgers, insulation 12G Elbows, conduit 7E Electric brakes 12L Electric fence controllers 3J Electric furnace cable 5D Electric furnace cable 1D Electric furnace cable 1D Electric furnaces 11C Electric metallic tubins 7F Electric ovens 11C Electric ovens 11C Electric ovens 11C Electric space heaters 11A Electric space heaters 11A Electric space heaters 11A Electric steam bollers 12B Electrical tape 1D Electropiating devices 1D Electropiat	G	Installers, gear & bearing 123 Institutional lighting 9C Instrument motors 8D Instrument transformers 2B Instruments, indicating 10A Insulating compounds 12U Insulating compounds 12U Insulating materials 12Q to 12U Insulating materials 12Q to 12U Insulating paint 12U Insulating tools 12G Insulation testers 12A Insulation tools 12G Insulators, pole line 12B Intercom systems 9.10F Intercom systems 9.10F Intercom systems 9.10F Intercom systems 9.10F Intercom systems 10D Intercom systems 10D Intercom systems 10D Inverters 2B Irons, pollering 12G Irons, soldering 12G Irons, soldering 12G Isolating switches 12G
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Electric furnaces	Garden lights	Insulators, interior wiring
Electric ovens 11C Electric process heaters 11C	Gaseous-discharge lamps. 9F Gaskets, conduit fitting. 7E	Interlocks
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Electroluminescent panels	Generating sets	Irons, soldering
Electrostatic meters 10A Elements, heating 11C Elevator cable 5D	Generator replacement parts. 12M Generators . 5G Germanium rectifiers . 5G	the contract of
Elevator motors 8D Eliminators, static 12J	Gins, transformer. 12A Glass fiber insulation. 12A	Take ashlebullan managara a sa ta
Emergency lighting equipment 9E Enclosures, metal 3E, 5F	Gauges 12B Galvanometers 10A Gap gauges 22E Garden lights 9A Gas tube sign cable 9A Gas-turbing enerators 3F Gas-turbing 7F Gaselest 7F Ganatest 7F Gate & door openers 3J Gauges, air gap 12E Gear installers & extractors 12J Gearmotors 8F Generating sets 8F Generator controls 3J Generator replacement parts 12M Germanium rectifiers 2C Gins, transformer 12A Glass fiber insulation 12Q Glass fiber tape 12S Glow lamps 3F Glue pots 12J	Jacks, cable-pulling
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Key-operated switches	Miniature switches	Portable cord sets
Lacing hooks	Nails, pole-dating	Power tool motors
Lamp wire 6D Lamps, floor and table 9A Lamps, flooreacent 9E Lamps, lucreacent 9G Lamps, portable 9E Lamps, portable 9E Lamps, trouble 9E Lanterns 12B Leads, test 12I Leads, test 12I Leads, water-cooled 6D Lift twicks 12D Lift & towers, mobile 1B Lifts, wire reel 12B Light dimmers 3A Jighting fixtures 9A Lighting standards 9D Lighting protective equipment 4E	Non-metallic boxes	Protectors, motor overload
Line hardware 1D Line splices 1D Line trucks 1B Line trucks 1B Linemen's protective clothing 12A Linemen's tools 12A Links, high-voltage fuse cutout 4A Links, renewable fuse 4C Liquid-flow-activated switches 3H Liquid-flow-activated switches 3H Liquid-level alarms 10B Liquid-level switches & controls 3H	Oliers Motor 123	Prunis 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 1
Load Indicators	PAR lamps	Quartz, fused
Luminaries	Panels, electric heating 11A Panels, electroluminescent 9A Panels, service entrance 3D Paper insulation 12Q Parkway cable 6D Parts storage equipment 12D Paate, soldering 12P Pathy and the part of the	Raceway
Machine lights. 9E Machines, soldering. 12H Magnet wire. 6D Magnetic amplifiers. 3K Magnetic brakes 3K Magnetic contactors & starters. 3M Magneticers. 12J Magnetos. 10A Maintenance trucks. 12D Mandrela, conduit. 12C	Patio lights .9A Peak load indicators .0B Pendant switches .5A Phase angle meters .0A Phase sequence indicators .2B Phase-shifting transformers .2B Photoelectric controls .3H Photographic (arc) lighting .9C Plekups, conduit tool .12C	Raceway. 7A to 7L Raceway tools 12C Racks, cable 12.66 Racks, conduit 12C Racks, conduit 12C Radiators, steam electric 11A Radiators, transformer 2A Railwamanhole guard 1C Railwamanhole guard 6D Railway motors 8D Range cords 6E Range receptacles 5E Reactors, saturable 2K Reamers, conduit 12C Recettacles 5E Rectifiers 2C Rectifiers 2C
Maintenance trucks 12D Mandreis, conduit 12C Manhole equipment 1C Manual starters 3M Marine lighting 9D Marine motors 8D Marines wire & cable 6D Markers, conduit 7E Markers, pole 1D Markers, wire & cable 12P Masking tape 12R Masking tace protective 12N Masonry anchors 12K Masonry drills 12.1	Pickups Conduit Color Color	Rectifying transformers 2C Rectifying transformers 2B Reducers, fuse clip 4C Reducers, fuse clip 4C Reducers, fuse clip 4C Red lifts, wire 12B Reel-type trouble lamps 5E Reela, cable 12B Reels, fish tare 12B Reflector-flood lamps 9G Reflector-flood lamps 9G Reflectors, lighting fixture 9H Registers, in-and-out 10F Regulators, motor speed 3M Regulators, woitage 3F
Masoury drills	Platers—pad, brush or powder 12J Plates, switch & outlet box 5E Platforms, pole 1D Plating equipment 12J Plus fuses 4B	Relays 3N Remote control switches 3H Removers, wedge 12G Residential lighting 9A Resistors, load 3P Resistors, load 3P Respirators 5C Respirators 12N
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Meters 10A M-G sets 9F Mica insulation 12Q Miniature lamps 9G	Polyphase motors 88 Porcelain 1910 Portable air conditioners 11E Portable blowers 12J	Rubber tape. 12R Rubber tubing 12T Running-thread conduit 7E Rust-preventives 12P

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Selenium rectiners	Suburban cable	Tubing, flexible
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Siot wedges & sticks	Tapers, coil	Wall air conditioners
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	Thread guards, conduit	Winches, cable-pulling
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Spices & kits SF	Thermal lamp starters	Winches, cable-pulling 12B Winders, coil 12F Windings, motor & generator 12F Windings, motor & generator 12B Wire, cable & cords 6A,B.C.D.E Wire & cable compounds 12P Wire & cable reels 12B Wire & cable supports 6G
Sign cable, gas tube	Thread guards, conduit 7E Threaders, conduit 12C Through-cord switches 5A Time switches 5 5H Time switches 5 5H Timing motors 8D Timing & time delay relays 3N Toggle bolts 12K Tongs, pole 12A Tool bags & holders 13J Tool motors 8D 3D 3D 3D 3D 3D 3D 3D	Wall air conditioners 11E Wall anchors 12K Wall plates 5E Warning lights 9C Water-cooled leads 6D Wattmeters 10A Weatherproof boxes 5D Weatherproof lighting 9A, 9D Weatherproof motors 8C Weatherproof outlets 6B Wedges, slot 12P Wedges, slot 12P Welding cable 6D Welding cable 6D Welding flux 12P Welding transformers 2B Winches, cable-pulling 12B Windows air conditioners 11E Windows air conditioners 11E Windows air conditioners 11E Wire, cable & cords 6A, B, C, D, E Wire & cable coupounds 12P Wire & cable coupourds 6G Wire & cable tools 12B Wire, cable tools 12B Wire, cable tools 12B
Splices & kits Splices & kits Splices & kits Splices & kits Splices Splices Splices Splices Splices Sprayers 123 Spreaders Sprayers 125 Sprayers Stage lighting Splices Sp	Tongs, pole	Winches, cable-pulling 12B Winders, coll 12F Winders, coll 12F Windings, motor & generator 12M Window air conditioners 11E Wire, cable & cords 6A, B, C, D, E Wire & cable compounds 12P Wire & cable compounds 12B Wire & cable supports 6G Wire & cable supports 6G Wire & cable tools 12B Wire fish 12B Wire nuts 6F Wire-stringing equipment 12A Wire & strip, fuse 4C Wire & strip, fuse 4C Wire & strip, fuse 4C Wire Wir
Splices & kits	Tongs, pole	Winches, cable-pulling 128 Winders, coil 125 Windings, motor & generator 125 Windings, motor & generator 126 Window air conditioners 116 Wincombie & cords 116 Wincombie & cords 128 Wire & cable compounds 129 Wire & cable reels 128 Wire & cable supports 66 Wire & cable tools 128 Wire & cable tools 128 Wire in uts 65 Wire in uts 65 Wire in uts 65 Wire-stringing equipment 124 Wire & strip fuse 40 Wire-strippers 128 Wire-strippers 128 Wire-stripping compound 129 Wire-stripping compound 129
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Splices & kits	Tongs, pole	Winches, cable-pulling 128 Winders, coil 125 Windings, motor & generator 125 Windings, motor & generator 126 Window air conditioners 11E Wire, cable & cords 64, B.C.D. E Wire & cable compounds 12P Wire & cable reels 12B Wire & cable supports 66 Wire & cable supports 65 Wire & cable tools 12B Wire nuts 65 Wire indicated 65 Wiring device switches 65 Wiring devices 65 Wiring dev
Splices & kits Sp.	Tongs pole 12A	Winches, cable-pulling 128 Winders, coil 125 Windings, motor & generator 125 Windings, motor & generator 126 Window air conditioners 11E Wire, cable & cords 6.8, C.D. E Wire & cable compounds 12P Wire & cable reels 12B Wire & cable supports 6.6 Wire & cable supports 6.6 Wire & cable supports 12B Wire nuts 12F Wire nuts 12F Wire nuts 12F Wire retrieved 12F Wire stringing equipment 12A C Wire stripping compound 12P Wire tags & markers 12P Wire tags & markers 12P Wireholders, pole line 1.D Wireways 7.1 Wiring devices boxes 5.1 5.6 Wiring devices 5.4 5.6 Work towers 12B Woven tape 128 W
Splices & kits	Tongs pole 12A	Winches, cable-pulling 128 Winders, coil 125 Windings, motor & generator 125 Windings, motor & generator 126 Window air conditioners 11E Wire, cable & cords 6.4, B.C.D. E Wire & cable compounds 12P Wire & cable reels 12B Wire & cable supports 6.6 Wire & cable supports 6.6 Wire & cable supports 6.7 Wire & cable supports 12B Wire, and 12F Wire & cable supports 12B Wire & strip, fuse 4.6 Wire strippers 12B Wire strippers 12B Wire strippers 12B Wire stripping compound 12P Wire tags & markers 12P Wire tags & markers 12P Wireholders, pole line 1.0 Wiring devices boxes 5.5 Wiring devices switches 5.4 to 6.6 Wiring devices 5.4 to 6.6 Wiring devices 5.5 Work towers 12B Wrapping 2.5 Wrapping 2.5 Wrought-iron conduit 7D
Splices & kits Splices &	Tongs pole 12A	Winches, cable-pulling 128 Winches, coll 125 Windlags, motor & generator 125 Windlags, motor & generator 126 Windlags, motor & generator 116 Wire, cable & cords 6.2 6.2 6.2 6.2 6.2 6.3 6.4 6.2 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6
Splices & kits	Tongs, pole	Wire & cable tools 12B Wire fish 12B Wire nuts 6F Wire-stringing equipment 12A Wire & strip fuse 4C Wire & strippers 12B Wire-stripping compound 12P Wire tags & markers 12P Wireholders, pole line 1D Wireways 7L Wiring device boxes 5D Wiring devices witches 5A Work towers 12D Woven tape 12S Wrapping, cable 13U Wrought-iron conduit 7D

U

LCGCAACODEBKCBCBCBCBRBRGHFMPNHGAPCNRRBPDFGMBDEQBDARTEP

SECTION 1. OUTDOOR DISTRIBUTION EQUIPMENT

See index for transmission line utilization equipment such as switches, transformers and cut-

1A. CONDUCTOR SUPPORTING STRUCTURES

1. Crossarms 2. Poles 3. Towers

Basic equipment used to support outdoor power transmission line conductors.

American Creosote Works Inc 1305 Dublin St (Box 4008) New Orleans 18 La (1-2) American Crossarm & Conduit Co 7726 Sherldan Rd Chicago 26 III (1) Chicago 26 III (1)
Bell Lumber & Pole Co 524 Midland Bank Bldg
Minneapolis 1 Minn (2)
Bodendieck Tool Co P O Box 499 Taylerville III Brooks Lumber Co P 0 Box 153 Bellingham Wash

(1)

8 rown Wood Preserving Co Inc. 409 Commonwealth
Blidg Leuisville 2 Ky (2)

Carney (8,1) & Co. 411 Peytan Bldg Spokane 8

Wash (2)

GRAYBAR ELECTRIC CO INC. 420 Lexington Ave
NY 17 NY (2)—ADV PG 2

Haley (R G) & Co Inc 767 Spitzer Bldg Toledo 4 Ohio (1) io (1) Matheway & Patterson Co Inc 15 County St Mansfield Mass (1) Hubbard & Co 6301 Butler St Pittsburgh 1 Pa

Hughes Bros Inc Seward Neb (1-3)
Husing Products Inc 5300 Vine St Cincinnati 17
Ohio (3)

Ohio (3)
International Paper Co Wood Preserving Div Kansas City 6 Mo (2)
Jostyn Mg and Supply Co 155 N Wacker Drive Chicago 6 III (1-2)
Keppers Co Inc Wood Preserving Div Keppers Bidg Pittsburgh 19 Pa (2)
Line Material Industries McGraw-Edison Co 700 W Michigan St Milwaukee Wis (1)
McFarland (L. D) Co McFarland Bidg Sandpoint Idaho (2)
National Pole & Treating Div Minnesota & Ontario

National Pole & Treating Div Minnesota & Ontario
Paper Co 500 Investors Bidg Minneapolis 2
Minn (2) Poles Inc E 706 Sprague Ave Spokane 3 Wash (1-2)

Republic Creosoting Co 1616 Merchants Bank Bidg Indianapolis 4 Ind (1-2) Union Metal Mfg Co 1432 Maple Ave Canton 5 Ohio (3)

18. LINE TRUCKS & MOBILE EQUIPMENT

Earth-boring trucks & machines
 Mobile towers & lifts
 Pole-setting trucks & bodies
 Trailers & dinkles
 Trenchers & ditchers

Apparatus used to transport, erect and maintain power transmission line equipment.

Adams Engineering Co 31711 Solon Rd Solon Ohio (1-4) Barber-Greene Co 400 N Highland Ave Aurora III

Charles Machine Works Inc P 0 Box 66 Perry Okia (5) Cleveland Trencher Co 20100 St Clair Ave Cleve-iand 17 Ohio (5)

Highway Trailer Co 405 E Fulton St Edgerton Wis (1-3-4) Holan (J H) Corp 4100 W 150 St Cleveland 11 Ohio (1-2-3-4)

Ohlo (1-2-3-4)

McCabe-Powers Auto Body Co 5900 N Broadway
St Louis 15 Mo (2-3-4)

Mobile Aerial Towers Inc 1730 N Harrison St
Fort Wayne Ind (2) Fort Wayne Ind (2)
Morrison Steel Products Inc 601 Amherst St Buffalo 7 NY (123) Pitman Mfg Co 300 W 79 Terrace Kansas City 14 Mo (2) Safety Live Line Tool Co 973 86th Ave Oakland 21 Calif (4)

21 Calif (4) Oakland alem Tool Co 767 S Ellsworth Ave Salem Ohio (1)

(1) Silent Hoist & Crane Co 841 63rd St Brooklyn 20 NY (2-3) Styworker Div Emhart Mfg Co 83 Ford St Milford Conn (2) Stahl Metal Products Inc 3490 W 140 St Cleveard 11 Ohio (4)

Utility Body Co 1530 Wood St Cakland 7 Calif Williams (Hugh B) Mfg Co 8330 Lovett St (P O Box 7815) Dallas Tex (1-3)

1C. MANHOLE EQUIPMENT

. Marriole Equipment
1. Cable duct shields
2. Cable racks, hangers, arms, hooks & extensions
3. Clay duct dowel pins
4. Guard rails, shields & tents
5. Manhole cover hooks
6. Manhole frames & covers
7. Manhole indders
8. Manhole steps
9. Pulling-in irons
10. Pumps
11. Ventilators

Basic underground equipment used in pre-viding access to cable runs.

Alhambra Foundry Co Ltd 1147 Meridan Ave Alhambra Calif (6-7-8) Aurora Pump Div New York Air Brake Co 54 Loucks St Aurora III (10) Chain Belt Co 4701 W Greenfield Ave Milwaukee 1

nance (A B) Co 210 North Allen St Centralia Mo (1-2-3-7-9)

ppe (T J) Div Rome Cable Corp Collegeville 5
Pa (1-2-4-5-6-8-9) Coppus Engineering Corp 344 Park Ave Worcester 10 Mass (11) ubbard & Co 6301 Butler St Pittsburgh 1 Pa (1-2-3-7-8)

(1-2-3-7-8)

Husky Products Inc 5300 Vine St Cincinnati 17

Ohio (2)

Joslyn Mfg and Supply Co 155 N Wacker Drive
Chicago 6 III (2-9)

Line Material Industries McGraw-Edison Co 700

W Michigan St Milwaukee Wis (2-9)

Oliver Electrical Mfg Co P O Box 217 Battle
Creek Mich (1-2-3-7-8-9)

Piqua Machine & Mfg Co 441 S College St Piqua
Ohio (10)

St Louis Mallanhie Passing Co 7702 M Content

Ohio (10)
St Louis Malleable Casting Co 7701 N Conduit
Ave St Louis 15 Mo (2) Ave St Louis 15 Mo (2)
Steel City Electric Co 1207 Columbus Ave Pittsburgh 33 Pa (2)
Sumo Pumps Inc P O Box 983 Stamford Cone (10)

Swett (A L) Iron Works 166 Glenwood Ave Medina NY (6) nor Power Tool Co 175 N State St Aurora

United Electric Motor Co 178 Centre St N Y 13 NY (11) Utilitles Service Co 1 Pine St Allentown Pa

1D. POLE & TOWER EQUIPMENT

Anchoring & guying materials
 Dating noils & markers
 Grounding equipment
 Insulators & wireholders
 Pole, crossarm & line hardware
 Platforms & accessories

Pole & crossarm hardware includes such ma-terials as dead ends, armor rods, line splices, brackets, special bolts and pins, catenary supports, etc.

lackburn (Jasper) Corp 1525 Woodson Rd St Louis 14 Mo (3)

Brewer-Titchener Corp 111 Port Watson St Cort-land NY (5) Chance (A B) Co 210 North Allen St Centralia Mo (1-2-3-4-5) Copperweld Steel Co Wire and Cable Div Glassport Pa (1-2-3) Pelta-Star Electric Div H K Porter Co Inc 2437 Fulton St Chicago 12 III (1-4) Dixie Electrical Mfg Co P 0 Box 745 Birmingham Ala (1-3-4-5)

Alabertoline Mfg Co 2622 E 51st St Cleveland a Ohio (4-5) Fargo Mfg Co Inc 845 Main St Poughkeepsle NY (5) Mfg Co 2622 E 51st St Cleveland 4 Fletcher Mfg Co 302 E 2nd St Dayton 2 Ohio

GRAYBAR ELECTRIC CO INC 420 Lexington Ave MY 17 NY (1-2-3-4-5)—ADV PG 2 Grip-Title Mfg Co 115 W Jefferson St Winterset Iowa (1) Hubbard & Co 6301 Butler St Pittsburgh 1 Pa (1-2-3-4-5)

(1-2-3-4-5)
Hughes Bros Inc. Seward Neb (1-3-5-6)
Hussey (C G) & Co 2850 Second Ave Pittsburgh
19 Pa (2)
Illinois Electric Porcelain Co 510 N Pearl St
Macomb III (4)
Joslyn Mfg & Supply Co 3700 S Morgan St
Chicage 9 III (1-5)

Kearney (James R) Corp 4236 Clayton Ave St Louis 10 Mo (1) Kimble Glass Co P O Box 1035 Toledo 1 Ohlo (4) Knox Porcelain Corp 2706 Mynders Ave (P 0 Box 2031) Knoxylle 1 Tenn (4-5) Insulator Co Inc 35 Gilbert St Leroy NY

(4)
Line Material Industries McGraw-Edison Co 768
W Michigan St Milwaukee Wis (1-3-4-5)
Midwest Electric Mfg Co 1639 Walnut St Chicage
12 III (3)
Ohio Brass Co 380 N Main St Mansfield Ohio (4)
Civer Electrical Mfg Co P 0 Box 217 Battle
Creek Micb (1-2-3-4-5)
Report Creek Micb (1-2-3-4-5) Porcelain Products Inc 224 N Patterson St Carey Ohio (4-5)

Ohio (4-5)
Preformed Line Products Co 5349 St Clair Ave
Cleveland 3 Ohio (1)
Premax Products Div Chisholm-Ryder Co Inc Cailege & Highland Aves Mlagara Falls NY (2-3)
Royal Electric Mfg Co 1122 E 87 St Chicago 19
III (4)

III (4)
Safety Live Line Tool Co 973 86th Ave Oakland
21 Calif (3-6)
St Louis Malleable Casting Co 7701 N Cenduit
Ave St Louis 15 Mo (4-5)
South River Metal Products Co Inc 377 Turnplice
South River NJ (1)
Universal Ciay Products Co 1558 First St Sandusky
Ohio (4)
White Sanding Co 1 Pine St Allentown Pa

Ohio (4)
Utilities Service Co 1 Pine St Allentown Pa (1-2-3-4-5)
Victor Insulators Div I-T-E Circuit Breaker Co Victor NY (4)

Victor NY (4) Weaver (J A) Co 2110 Howard St St Louis 6 Me

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

*Code Description, Pages Catalog No. & Mfr.

Anchoring for Power & Communication Lines; 25p (Chance) 1-1

Pole Line Specialties; 99p (St Louis)

Safety Live Line Tools; 48p; Cat. No. 9 (Safety)

Transmission Distribution and Substation Products; 240p; Cat. No. 11 (Hughes)

Handbook of Treated Forest Products; 45p (American Creosote) 1-5

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the Electrical Products Guide" when ordering. Prices are subject to change.

A. B. Chance Co., 210 N. Allen St., Centralia, Mo.: Hot Sticks: A Manual on High Voltage Line Mainte-nance, 162p. Price: \$2.50

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., New York 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

Electrical Construction and Maintenance, 330 W. 42nd St., New York 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price:

SECTION 2. TRANSFORMERS AND CONVERSION EQUIPMENT

2A. POWER & LIGHTING TRANSFORMERS, AUTOTRANSFORMERS & ACCESSORIES

Dry-type transformers
 Liquid-filled transformers
 Transformer radiators
 Transformer bushings

General-purpose transformers for sub-stations, building light and power, and transmission line distribution.

A C Transformer Corp 89 Madison St Newark NJ (1)
Acme Electric Corp 36 Water St Cuba NY (1)
Aliis-Chalmers Mfg Co 930 S 70th St Milwaukee
1 Wis (1-2-4)
Atlantic Transformer Co 5143 N 2nd St Phila 20
Pa (1)
Atlantic Transformer Co 5143 N 2nd St Phila 20 Atlantic Transformer Div New London Instrument Co Inc 30 Myres Ave Groton Conn (1-2) Central Transformer Corp P 0 Box 687 Pine Bluff Ark (1-2) Ark (1-2)
Crittenden Transformer Works Inc 1220 Nadeau St
Los Angeles 1 Calif (1)
Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III (2)
Dongan Electric Mfg Co
Detroit 7 Milch (1)
Electro Engineering Works 401 Preda St San
Leandro Calif (1)
EREE ELECTRIC CO INC 343 Birdsail St Buffalo
2 NV 1-21—ADV PG 162
Esco Mfg Co P O Box 1039 Greenville Tex (1-2)
Federal Pacific Electric Co 50 Paris St Newark 5
NJ (1-2)
General Electric Co Annarative Sales Div Sethera

NJ LI-22

General Electric Co Apparatus Sales Div Schenectady 5 NY (1-2)

GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (1-2)—ADV PG 2

Hevi Duty Electric Co P 0 Box 563 Milwaukee 1
Wis (1)

Hevi Duty Electric Co P V Box Sos Washington Wis (1)

HILL TRANSFORMER CO INC 1030 Washington St San Carlos Galif (2-2)—ADV PG 173 Hindle Transformer Co Inc Woods Church Rd Flemington NJ (1)

1-T-E CIRCUIT BREAKER CO 19th & Hamilton Sts Phila 30 Pa (1-2)—ADV PG 94-95

Jefferson Electric Co 25th & Madison Beliwood

Jeffries Transformer Co 610 Turner St Los Angeles 12 Calif (1) 12 Calif (1)
Kolton Electric Mfg Co 123 New Jersey Raliroad
Ave Newark 5 NJ (1-2)
Kuhiman Electric Co P O Box 288 Birmingham
Mich (1-2) Land-Air Inc 7444 W Wilson Ave Chicago 31 Illinois (1)

Illinois (1)
Lindberg Engineering Co 2450 W Hubbard St Chicago 12 III (1)
Line Material Industries McGraw-Edison Co 700
W Michigan St Milwaukee Wis (1-2)
MARNATRAN INC P 0 Box 211 Kearny NJ
(1-2)—ADV PG 164
MARCUS TRANSFORMER CO INC
Rahway NJ (1-2)—ADV PG 168
Marcus Transformer Co Inc Lessville Ave
Rahway NJ (1-2)—ADV PG 168
Marcus Transformer Co Inc Lessville Ave
Rahway NJ (1-2)—ADV PG 168

Marcus Tran NJ (1-2) NJ (1-2)

Noloney Electric Co 5390 Bircher Blvd St Louis
20 Mo (1-2)
Notheffer Winding Labs Inc 5 Albemarle Ave
(P 0 Box 455) Trenton 3 NJ (1)
Pennsylvania Transformer Div McGraw-Edison Co
Box 330 Cannonsburg pa (1-2)
PRECISION TRANSFORMER CORP 2218 West Lake
St Chicago 12 III (1-2)—ADV PG 167
R 7 & E Corp 1900 East North St Waukesha Wis
(2)

Raytheon Mfg Co Commercial Equipment Div 100 River St Waltham 54 Mass (1) Shaw-Perkins Mfg Co 201 E Carson St Pitts-burgh 19 Pa (3)

Shaw-Perkins mrig co burgh 19 Pa (3) SORGEL ELECTRIC CO 838B W National Ave Milwaukee 4 Wis (1-2)—ADV PG 153 Standard Transformer Co 140 Dana St N E Warren Ohio (1-2) Uptegyaff (RE) Mfg Co P 0 Box 182 Scottdale

LI NY (3)
WESTINGHOUSE ELECTRIC CORP P 0 Box 668
Pittsburgh 30 Pa (1-2)—ADV PG 77-78-79-80
WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gates
way Center Pittsburgh 30 Pa (1-2)—ADV PG 2d Cover

2B. SPECIAL PURPOSE TRANSFORMERS

Arc & discharge lamp Control Heating

Identification
Instrument
Phase-changing or -shifting

7. Rectifying 8. Saturable reactor

9. Signalling
10. Tap-changing
11. Variable voltage
12. Voltage-regulatin
13. Welding, solderin
14. Pipe-thawing

ating ering & brazing

Transformers designed to serve specific or specialized functions or equipment.

A C Transformer Corp 89 Madison St Newark NJ (2-3-6-7-13)

A C Transformer Corp 89 Madison St Newark NJ (2-3-6-7-13)
Accurate Engineering Co 2005 Blue Island Ave Chicago 8 III (6)
ADVANCE TRANSFORMER CO 2950 N Western Ave Chicago 18 III (1)—ADV PG 117
Acro Welder Mfg Co 1719 W St Paul Ave Mill-waukee 3 Wis (13)
Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (5-7-8-10-12)
Annis (R B) Co 1101 N Delaware St Indianapolis 2 Ind (5)
Arjac Products Inc 55-59 Halstead St Rochester 10 NY (1)
Associated Research Inc 3777 W Belmont Ave Chicago 18 III (5)
Atlantic Transformer Co 5143 N 2nd St Phila 20
Pa (6)

Pa (6)

ra (6)
Atlantic Transformer Div New London Instrument
Co Inc 30 Hynes Ave Groton Conn (5-9)
Berkshire Transformer Corp Kent Conn (2-3-4-57-8-9-10-13)

Bush Transformer Corp 707 North St Endicott NY (1-2-3-4-5-6-7-8-9-10-12) Cable Electric Products Inc 234 Daboll St Providence 7 RI (9) dence 7 RI (9)
Central Transformer Co 900 W Jackson Blvd Chlcago 7 III (2-8-9-13)
Cold Cathode Lighting Corp Island CIty NV (1)
Crest Transformer Corp 1834-36 W North Ave Chicago 22 III (2-9)
Crittenden Transformer Works Inc 1220 Nadeau St Los Angeles 1 Callf (3-5-7-8)
Cutler-Hammer Inc 228 N 12th St Milwaukee 1
Wis (2)

Wis (2) Davenport Mfg Co 1713 N Ashland Ave Chicago 22 Dongan Electric Mfg Co 2987-3001 Franklin St Detroit 7 Mich (1-2-4-9)

Detroit 7 Mich (1-2-4-9)

Dormeyer Industries 3418 Milwaukee Ave Chicago 4.1 III (2-4-7-8-11)

Eagle Electric Mfg Co Inc 23-10 Bridge Plaza South Long Island City 1 NY (9)

Edwards Co Inc Norwalk Conn (9)

Electran Mfg Co 1901 Clybourn Ave Chicago 14

III (1-2-5-6-7-8-9-10-13)

Electric Arc Sales Co P 0 80x 587 Ypsilanti Mich (11)

Electrical Wilming 1905

Electrical Windings Inc 2015 N Kolmar Ave Chicago 39 III (5-8-12) Electrical Windings Inc. 2015 N Kolmar Ave Chicago 39 III (5-8-12)
Electro Engineering Works 401 Preda St. San Leandro Calif (2-4-6-8-12)
Esco Mfg Co P O Box 1039 Greenville Tex (8)
França Mfg Co 10325 Berea Rd Cleveland 2 Ohio

(1)
General Electric Co Apparatus Sales Div Schenectady 5 NY (1-2-4-5-6-7-9-11-12-13)
General Radio Co 275 Massachusetts Ave Cambridge 39 Mass (11)
Hevi Duty Electric Co P 0 Box 563 Milwaukee 1
Wis (2-3-6-8-10-12)
Hindie Transformer Co Inc.
Hongton NJ (2-3-6-7-9)
Jefferson Electric Co 25th & Madison Bellwood

III (1-2-4)
Jeffries Transformer Co 610 Turner St Los Angeles
12 Calif (2-6-9)
Knopp Inc 1307 66th St Oakland 8 Calif (5)
Knopp Inc 1307 66th St Oakland 8 Calif (5)
Kotton Electric Mfg Co 123 New Jersey Ralfroad
Ave Newark 5 NJ (2-6)
Lee Electric Inc 566 52nd St West New York
NJ (9)
Library Rall Mfg Co 125 September 1997 111 (1-2-4)

Liberty Bell Mfg Co Inc Swainsboro Ga (9)
Marcus Transformer Co Inc Leesville Ave Rahway

Electric Co 9640 Grinnel! Detroit 13

NJ (6) McCarthy El Mich (13) Mich (13)

MIDWEST ELECTRIC PRODUCTS INC 1515 N
Front St Mankato Minn (5)—ADV PG 172

Miller Electric Mfg Co 718 S Bounds St Appleton
Wis (13)

Molorow Electric Of 7 Moloney Electric Co 20 Mo (7-10-12) 5390 Bircher Blvd St Louis

20 Mo (7-10-12)
Nepo Mfg Co 4230 N Sayre Chicago 34 III (1)
Nothelfer Winding Labs Inc 5 Albemarle Ave (P O
Box 455) Trenton 3 NJ (3-5-7-8-13)
Nutone Inc Madison & Red Bank Roads Cincinnati 27 Ohio (9) ...
Ohmite Mfg Co 3601 Howard St Skoke III (11)
Opad Electric Co 69 Murray St New York 7
NY (7)
Partrick & Wiking Co 51 N Sew York 7 & Wilkins Co 51 N Seventh St Phila 6 Partrick

Pa (9) Pennsylvania Transformer Div McGraw-Edison Co Box 330 Cannonsburg Pa (3-10-11-13) Precision Transformer Corp 2218 West Lake St Chicago 12 III (2-3-7-13) Raytheon Mfg Co Commercial Equipment Div 100 River St Waltham 54 Mass (7-13) Rittenhouse Co Inc East St Honeoye Falis NV (9) Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa (9) Russell & Stoll Co Inc 125 Barclay St N Y 7 NY (2) Sangamo Electric Co 11th & Converse Springfield

III (5)
Simplex Co 1139-41 N MacArthur Blvd Springfield III (5)
SOLA ELECTRIC CO 4633 W 16th St Chicago 50
III (1-12)—ADV PG 149
Sorenson & Co. Richards Ave South Norwalk
Conn (6-7-12) Co. 8388 W National Ave Mil-Conn (6-7-12)
Sorgel Electric Co 838B W National Ave Milwaukee 4 Wis (2-3-6-7-8-9-10-13-14)
Southwestern Industrial Electronics Co 2831 Post
Oak Rd (P 0 Box 13058) Houston 19 Tex
(5-7-8-12) Sparti Faraday Inc 1322 E Church St Adrian Mich (1-5-9) Standard Transformer Co 140 Dana St N E War-ren Ohlo (5)

s Co 19 New Park Ave Hartford 6 Conn (6) ior Electric Co 83 Laurel St Bristol Cenn States Co (11) (11)
Taylor-Winfield Corp 1052 Mahoning Ave Warren
Ohio (3-13)
Trine Mfg Corp 1430 Ferris Place NY 61 NY (9)
United States Electronics Corp 275 Warren St
Lyndhurst NJ (2)
United Transformer Co 150 Varick St New York 13
NY (1-2-3-5-7-8-9-11-12)
Uptegraff (RE) Mfg Co P 0 Box 182 Scottdale
Pa (2-3-5)

Pa (2-3-5)
Western Electro-Mechanical Co Inc 300 Breadway
Oakland 7 Calif (5)
Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa (1-2-5-6-9-12)
Weston Instruments Div of Daystrom Inc 614
Frelinghuysan Ave Newark 5 NJ (5)

2C. RECTIFIERS

Apparatus used for industrial applications which require conversion of alternating to direct current.

Accurate Engineering Co 2005 Blue Island Ave Chicago 8 III (5)
Allis-Chalmers Mfg Co 930 S 70th St Milwaukee
1 Wis (3-4-6)
American Rectifier Corp 95 Lafayette St NY 13
NY (5-6)

NY (5-6)
Bogue Electric Mfg Co 52 Iowa Ave Paterson 3
NJ (5-6)
Cathodic Protection Service 4601 Stanford St
Houston Tex (5-6)
Christle Electric Corp 3410 West 67 St Les
Angeles 43 Calif (5-6)
Conant Laboratories 6500 "0" St Lincoln 5 Neb
(1-5)
Gates Electronic Co 2090 Barnes Ave Bronx 62 Gates Electronic Co 2090 Barnes Ave Bronx 62 NY (5-6)

NY (5-6)
General Electric Co . Apparatus Sales Div Schenectady 5 NY (1-2-3-5-6)
I-T-E Circuit Breaker Co 19th & Hamilton Sts Phila 30 Pa (3-4-6)
I T & T Components Div P O Box 412 Clifton NJ (5-6)

NJ (5-6)

Kelloog Switchboard and Supply Co 79 W Monroe St Chicago 3 III (5)

Kneisley Electric Co 2501-2509 Legrange St Toledo 3 Ohio (2-5)

Magnatran Inc P 0 Box 211 Kearny NJ (2)

Mallory (P R) & Co Inc 30 S Gray St Indianapolis 6 Ind (1)

Miller (Sanford) Co 691 Bedford Ave Brooklyn 6 Onad Flastels Co 6 Attention

Opad Electric Co 69 Murray St NY 7 NY (5) Potter & Rayfield Inc P 0 Box 1042 Atlanta Ga (2) Pyramid Electric Co 1445 Hudson Blvd North Bergen NJ (5)

Bergen NJ (5)
Radio Receptor Co Inc 240 Wythe Ave Brooklyn
11 NY (5)
Rapid Electric Co 2881 Middletown Rd Bronx 61
NY (3-5-6)

NY US-3-6) Reliance Electric & Engineering Co 24701 Euclid Ave Cleveland 17 Ohio (2) Schuer Mfg Corp 4500 Alpine Ave Rossmoyne Ohio (1) Onto (1) Shrader (F W) Co 11623 S Broadway Los Angeles 61 Calif (3-5-6)

61 Calif (3-5-6)
Steams Electric Corp 120 N Broadway Milwaukee
2 Wis (5)
Sylvania Electric Products Inc 1740 Broadway
NY 19 NY (3)
Syntron Co 690 Lexington Ave Homer City Pa (5)
Ther Electric & Machine Works 17 S Jefferson St
Chicago 6 III (1-2-5)
Vickers Inc Electric Products Div 1847 Locust St
St Louis 3 Mo (5)

Walker Div Norma-Hoffmann Bearings Corp Stam-ford Conn (3-5-6)
Weltronic Co 19500 W Eight Mile Rd Detroit 41 Mich (2) Westinghouse Electric Corp P O Box 868 Pitts-burgh 30 Pa (1-2-3-5-6)

2D. CONVERTERS

1. Frequency changers 2. Inverters

2. Inverters
3. Phase converters & shifters
4. Static converters
5. Synchronous (rotary) converters

Static and rotary converters are used to transform ac current to dc; inverters (static or rotary) are converters which transform dc to ac. Frequency changers convert normal 60-cycle current to a higher frequency; phase converters provide 2- or 3-phase power from a single-phase source, or vice versa.

Allis (Louis) Co 427 East Stewart St Milwaukee 1 Wis (1) 1 Wis (1)
Allis-Chalmers Mfg Co 930 S 70th St Milkaukee
1 Wis (1-4-5)
American Electronics Inc 655 West Washington
Blvd Los Angeles 15 Calif (1)
Begue Electric Mfg Co 52 Iowa Ave Paterson 3
NJ (1-2-5)

Carter Motor Co 2711 W George St Chicago 18

Continental Electric Co Inc 325 Ferry St Newark NJ (1) 5

S. N. (1)

Cornell-Dubilier Electric Corp 333 Hamilton Blvd South Plainfield NJ (2)

D & R Ltd 402 E Gutierrez St P 0 Box 1500 Santa Barbara Calif (1)

Dalmotor Co 1375 Clay St Santa Clara Calif (1)

Delta-Star Electric Div H K Porter Co Inc 2437 Fulton St Chicago 12 III (1)

Elcor Div F L Jacobs Co 4235 W North Ave Chicago 39 III (1-2-5)

Electric Machinery Mfg Co 800 Central Ave Minnaapolis 13 Minn (1)

Electric Motors & Specialties Inc King & Hamsher Sts Garrett Ind (1)

Electric Motors & Specialties Inc King & Hamsher Sts Garrett Ind (1)

Electric Specialty Co 211 South St Stamford Conn (1)

Elliott Co Jeannette Pa (1)

Comm (1)

Fairbanks Morse & Co 600 S Michigan Ave Chicago 5 III (1)

Gemco Electric Co 25685 W Eight Mile Rd Detroit 40 Mich (3)

General Electric Co Apparatus Sales Div Schenectady 5 NY (1)

General Electric Co Apparatus Sales Div Schenectady 5 NY (1)
Georator Corp Manassas Va (1)
Graham (Phillip E) Co Inc 1262 Udell St (P O Box 5824) Indianapolis 23 Ind (3)
Hertner Electric Co 12690 Elmwood Ave Cleveland 11 Ohio (12-5)
Ideal Electric and Mfg Co East First St Mansfield Ohio (1)
Jerrold Electronics Corp 23rd & Chestnut Sts Phila 3 Pa (1)

Electronics Corp 23rd & Chestnut Sts 3 Pa (1)

Phila 3 Pa (1)

MATO ENGINEERING CO 1442 First Ave Mankato Minn (1-2-3-5)—ADV PG 168

Kellogg Switchboard and Supply Co 79 W Monroe St Chicago 3 III (1-2)

Knopp Inc 1307 66th St Oakland 8 Calif (3)

Kurz & Root Sales & Engineering Corp 232 East North Island St Appleton Wis (1)

Minneapolis-Honeywell Regulator Co Boston Div 40

Life St Boston 35 Mass (4-5)

Robbins & Myers Inc 1345 Lagonda Ave Spring-field Ohio (1)

Sangamo Electric Co 11th & Converse Springfield III (5)

Sorensen & Co Inc Richards Ave South Norwalk

Sorensen & Co Inc Richards Ave South Norwalk Conn (1)

Syntron Co. 19 New Park Ave Hartford 6 Conn (3)
Syntron Co. 690 Lexington Ave Homer City Pa (4)
Terado Co. 1068 Raymond Ave St Paul 14 Minn (2)

Tocco Div Ohio Crankshaft Co 3800 Harvard Ave Cleveland 5 Ohio (1)

Wakefield Co 731 S Water St Vermilion Ohio (1)

Weltronic Co 19500 W Eight Mile Rd Detroit 41

Mich (1)

Westinghouse Electric Corp P O Box 868 Pitts-burgh 30 Pa (1)

2E. BATTERIES

Primary, dry
 Primary, wet
 Secondary (storage)

Primary dry cells are replaced when exhausted; primary wat cells may be restored by replacing electrolyte and electrose when necessary. Secondary or storage batteries are recharged using a primary source of electrical energy.

Bright Star Industries 600 Getty Ave Clifton NJ

Burgess Battery Co Freeport III (1)
C & D Batteries Inc Conshohocken Pa (3)
Carbone Corp 400 Myrtle Ave Boonton NJ (1)
Dual-Lite Co Inc 185 Front St Bridgeport NJ (1-2) Carbone Corp
Dual-Lite Co Inc 185 Front 35
Conn (3)
DuBois Electric Storage Battery Co 500 W DuBois
Ave DuBois Pa (3)
Edison Storage Battery Div McGraw-Edison Co
West Orange NJ (3)

Exide Industrial Div Electric Storage Battery Co 42 S 15 St Phila 2 Pa (3) Gould-National Batteries Inc Trenton 7 NJ (3) Guiton Industries Inc Alkaline Battery Div Metu-chen NJ (3) Co 2131 Beuter Rd Fort Wayne 4 Ind (1)
Maliory (P R) & Co Inc 30 S Gray St Indianapolis 6 Ind (1)
Marathon Battery Co P O Box 298 Wausau Wis National Carbon Co 535 Fifth Ave New York 17 NY (1-2) Gould-National Batteries Inc East-Nicad Div

Nicad Div Gould-National Batteries Inc East-hampton Mass (3)
Onan (D W) & Sons Inc University Ave SE at 25th Minneapolis 14 Minn (3)
Scranton Storage Battery Corp Archbald Pa (3)
Sonotone Corp Battery Div Elmsford NV (3)
Standard Electric Co Inc P O Box 6356 San Antonio 12 Tex (3)
Surrette, Storage Battery Co Inc. 1efferson Ave

Surrette Storage Battery Co Inc Jefferson Ave Salem Mass (3) Salem Mass (3)
Willard Storage Battery Div Electric Storage Battery Co 246 E 131 St Cleveland 8 Ohio (3)
Wisconsin Storage Battery Co 1222 18th St Racine

Electric orp 40-50 Leonard St New York 13 NY (2-3)

2F. BATTERY CHARGERS

Equipment, complete with necessary con-trols, for restoring secondary batteries. May incorporate metallic-oxide rectifers, elec-tronic tube rectifiers, or motor-generator

Accurate Engineering Co 2005 Blue Island Ave Chicago 8 III Allis (Louis) Co 427 East Stewart St Milwaukee Automatic Switch Co 50-56 Hanover Rd Florham Electric Co 5713 Wentworth Ave Chicago 21 Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ Christie Electric Corp 3410 West 67 St Los Angeles 43 Calif
Cornell-Dubiller Electric Corp
South Plainfield N.J
Curtis Development & Mfg Co 3244 N 33 St Mil-

waukee 16 Wis Dante Electric Mig Co Bantam Conn Delta-Star-Electric Div H K Porter Co Inc. 2437 Fulton 5t Chicago 12 III Glison Storage Battery Div McGraw-Edison Co West

Orange NJ Electric Power Plants Corp Buffalo St Cadiz Electric Products Co 1725 Clarkstone Rd Cleveland 12 Ohio Electric Service Systems Inc 1330 Quincy St NE Electric Service Systems in 1330 Quincy St. NE. Minneapolis 13 Minn Fairbanks Morse & Co. 600 S Michigan Ave. Chi-cago 5 III Fox Products Co. 4720 N 18 St. Phila 41 Pa Gates Electronic Co. 2090 Barnes Ave. Bronx. 62

NV eral Electric Co Apparatus Sales Div Schenec-

General Electric Co Apparatus Sales DIV Schenec-tady 5 NY Gould-Mational Batteries Inc Trenton 7 NJ Hertner Electric Co 12690 Elmwood Ave Cleve-land 11 Ohio Ohio Hobart Square Troy 1 Ohio Istries Inc 1760 State St Howard Industries Inc Racine

Jordan Electric Products Div Electric Storage Bat-tery Co 222-228 N 2nd St Minneapolis 1 Minn

Kato Engineering Co 1442 First Ave Mankato

Minn
Katolight Corp First Ave at Chestnut (P 0 Box 891) Mankato Minn
Kohler Co Kohler Wis
Kurz & Root Sales & Engineering Corp 232 East
North Island St Appleton Wis
Mallory (P R) & Co 30 S Gray St Indianapolis 6

Ind

Ind Motoresearch Co 1600 Junction Ave Racine Wis Onan (D W) & Sons Inc University Ave S E at 25th Minneapolis 14 Minn Quick Charge Inc 10th & Missouri Sts Oklahoma City 17 Okla Schauer Mfg Corp 4500 Alpine Ave Rossmoyne Ohio

Syntron Co 690 Lexington Ave Homer City Pa Universal Motor Co 438 Universal Dr Oshkosh Walker Div Norma-Hoffman Bearings Corp Stam-

Walker DIV Norma-Hoffman Bearings Corp Stamford Conn
Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa
Williard Storage Battery Div Electric Storage Battery Co 246-286 E 131 St Cleveland 8 Ohio
Winpower Mfg Co Newton Iowa

2G. BATTERY & CHARGING ACCESSORIES

Auxiliary equipment specifically intended to aid in the use and care of batteries and charging equipment, such as cable leads and clamps, testers, charging plugs and regulators.

Allen Electric and Equipment Co 2101-2117 N

Anderson (Albert & JM) Mfg Co 289 A St Boston 10 Mass Belden Mfg Co P O Box 5070A Chicago 80 III Blitz Electric Co 5713 Wentworth Ave Chicago 21 III
Bryant Mfg Co 410 N Paulina St Chicago 22 III
C & D Batteries Inc Conshohocken Pa
Exide Industrial Div Electric Storage Battery
42 S 15 St Phila 2 Pa
Fox Products Co 4720 N 18 St Phila 41 Pa
Gates Electronic Co 2090 Barnes Ave Bronx 62
MY Goldak Co Inc 1544 W Glenoaks Blvd Glendale Calif 1 Calif Hollingsworth Co Solderless Terminal Div Box 430 Phoenixville Pa Jordan Electric Products Div Electric Storage Bat-tery Co 222-228 N 2nd St Minneapolis 1

Minn
Joy Mfg Co Electrical Products Div 1201 Macklind Ave St Louis 10 Mo
Kellogg Switchboard and Supply Co 79 W Monree
St Chicago 3 III
Mueller Electric Co 1555G E 31 St Cleveland 14 Ohio England Electrical Works Inc 365 Main St Lisbon NH New Jersey Zinc Co 160 Front St New York 38 NY

Ohmite Mfg Co 3601 Howard St Skokle III
Penn-Union Electric Corp 315 State St Erie Pa
Pollak (Joseph) Corp 81-95 Freeport St Boston 22 Mass Russell & Steel Co Inc 125 Barclay St NY 7

NYY
St Marys Carbon Co State St St Marys Pa
Sittler Corp 18 N Ada St Chicago 7 III
Stackpole Carbon Co Stackpole St St Marys Pa
Victor Instrument Mfg Co Inc 33 W 60 St New

Vork 23 NY
Walker Brothers End St. Conshohocken Pa
Willard Storage Battery Div Electric Storage Battery Co 246-286 E 131 St. Cleveland 8 Of

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

*Code No. Description, Pages Catalog No. & Mfr.

- 2-1 Transformer Cooling Radiators; 8p; Cat. No. E3M50 (Shaw-Perkins)
- Selenium Rectifiers; 22p; Cat. No. 177A (Radio Receptor) 2-2
- Dry-Type Power & Lighting Transformers; 8p; Cat. No. 200 (Hevi Duty) 2-3
- Industrial Selenifiers & Controls; 12p; Cat. No. 441 (American Rectifier)
- Solenoids, Coils & Transformers; 22p; Cat. No. 35 (Dormeyer) 2-5 Lift Truck Battery Service Manual; 48p; (C&D) 2-6
- 2-7 Selenium Power Rectifiers; 16p; Cat. No. 300
- 2-8 Instrument Rectifiers: 40p: Cat. No. IRB6 (Conant)
- Instrument Rectifier Replacement Guide; 40p; Cat. No. RG56 (Conant)
- 2-10 Load Center Transformers & Substations; 10p; Cat. No. 655 (Sorgel)
- Storage Batteries In Industry; 35p; Cat. No. SB3805 (Edison) 2-11
- 2-12 Dry-Type Distribution Transformers; 12p; Cat. o. A2 (Acme)
- Variable Transformers; 100p; Cat. No. P258G 2-13
- 2-14 Power & Light Distribution Transformers; 40p (Precision)
- 2-15 Selenium Rectifiers; 47p; Cat. No. 3116-1 (Vickers)

Write directly to the indicated address for the following, enclosing remittance.

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price: \$1.50

SECTION 3. SWITCHING & CONTROL EQUIPMENT

Indicating devices and alarms used in conjunction with switches and controls are listed in Section 10.

3A. UNIT SUBSTATIONS

Complete assemblies for transformation and distribution of primary power.

Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1

WIS
CONTINENTAL ELECTRIC EQUIPMENT CO Box
1055 Cincinnati 1 Ohio—ADV PG 3rd Cover
Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III
General Electric Co Apparatus Sales Div Schenectady 5 NY
Hughes Bros Inc Seward Nob
LT-E-Circult Bearing Co Switchnaga Div 1924

Hughes Bros Inc Seward Neb
1-T-E Gircuit Breaker Co Switchgear Div 1924
Hamilton St Philadelphia 30 Pa
Line Material Industries McGraw-Edison Co 700
W Michigan St Milwauker Wis
Mullenbach Div Electric Machinery Mfg Co 2300
E 27 St Los Angeles 58 Calif
Nelson Electric Mfg Co P 0 Box 5385 Tulsa Okta
Pennsylvania Transformer Div McGraw-Edison Co
Box 330 Canonsburg Pa
Royal Electric Mfg Co 1122 E 87 St Chicago 19

SORGEL ELECTRIC CO 838B W National Ave Mil-waukee 4 Wis-ADV PG 153 Southern Electrical Equipment Co 308 West Bland at Mint St Charlotte 3 NC Square D Co 6060 Rivard St Detroit 11 Mich Standard Transformer Co 140 Dana St N E Warren

Westinghouse Electric Corp P 0 Box 868 Pitts-burgh 30 Pa Young Electric & Mfg Co Inc 2134 Curtis Denver 2 Zinsco Electrical Products 729 Turner Los Angeles

TR SWITCHGEAD

Enclosed assembly of switching and inter-rupting devices and associated equipment for distribution of power.

Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis
Cleveland Switchboard Co 2925 E 79 St Cleveland 4 Ohio
CONTINENTAL ELECTRIC EQUIPMENT CO Box
1055 Cincinnati 1 Ohio—ADV PG 3rd Cover
Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III
Federal Pacific Electric Co 50 Paris St Newark NJ G & W Electric Specialty Co 3500 W 127 St Blue Island III
General Electric Co Apparatus Sales Div Sche-

nectady 5 NY
GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY—ADV PG 2
Gustaveson Inc 8600 Chestnut St Kansas City 30 I-T-E Circuit Breaker Co Switchgear Div 1924 Hamilton St Philadelphia 30 Pa Lake Erie Electric Mfg Inc 2952 W 22 St Erie Pa Marquette Electric Switchboard Co 311 N Des-plaines St Chicago 6 III Mullenbach Div Electric Machinery Mfg Co 2300 E 27 St Los Angeles 58 Calif Nelson Electric Mfg Co P O Box 5385 Tulsa

Dkia Pennsylvania Transformer Div McGraw-Edison Co Box 330 Canonsburg Pa Pyle-National Co 1344 N Kostner Ave Chicago 51

Russell & Stoll Co Inc 125 Barclay St NY 7

S & C Electric Co 4435 Ravenswood Ave Chicago 40 III—ADV PG 169
Souver D Co 6060 Rivard St Detroit 11 Mich V V Fitting Co 711 Cherry St Phila 6 Pa WESTINGHOUSE ELECTRIC CORP P O Box 366 Pittsburgh 30 Pa—ADV PG 77-78-79-80 WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway Center Pittsburgh 30 Pa—ADV PG 2d Cover Young Electric & Mfg Co Inc 2134 Curtis Denver 2 Color Electrical Products 799 Turner Los Angeles Zinsco Electrical Products 729 Turner Los Angeles

3C. SWITCHBOARDS

- 1. Metering & control
- 2. Power & light
- 3. Stage
- 4. Laboratory & experimental

Metering & control boards and panels mount devices used to regulate, indicate and record operation of such equipment as boilers, turbines, furnaces and industrial processing equipment.

Adam (Frank) Electric Co 3647 Windsor PI St Louis Mo (22-50) Louis Mo (22-60) Moreonfield Ave Mil-waukee 4 Wis (2) Moreonfield Ave Mil-waukee 4 Wis (2) 70th St Milwaukee 1 Wis (1-2)
Alwait Mfg Co 1706 Lapham Dr Modesto Calif
(1) (1)
Capitol Stage Lighting Co Inc 527 W 45 St New York 36 NY (3)
Century Lighting Inc 521 W 43 St New York 36 NY (3)
Clark Controller Co 1146 E 152 St Cleveland 10 Ohio (2) Ohio (2)
Cleveland Switchboard Co 2925 E 79 St Cleveland 4 Ohio (1-2-3)
Continental Electric Equipment Co Box 1055 CIncinental 1 Ohio (1-2-3)
Control Panel Corp 517 W Monroe St Chicago 6 Cutler-Hammer Inc 228 N 12 St Milwaukee 1 Cutier-Hammer Inc 228 N 12 St Milwaukee 1 Wis (2)
Delta-Star Electric Div H K Porter Co Inc 2437 Fulton St Chicago 12 III (1-2)
Dixie Controller Inc Post Office Box 5844 Birmingham 9 Ala (1)
Ederer Engineering Co 2943 1st Ave S Seattle 4 Wash (1)
Electric Machinery Mfg Co 800 Central Ave Minneapolis 13 Minn (1-2)
Esco Mfg Co P O Box 1039 Greenville Tex (2)
Federal Pacific Electric Co 50 Paris St Newark 5 NJ 200 NJ (2) Electric Co 25685 W Eight Mile Rd Detroit Mich (1-2) 40 General Electric Co Apparatus Sales Div Sche-nectady 5 NY (1-2) neral Electric to Apparatus Sales Div Sche-nectady S NY (1-2) eneral Electric Co Industrial Power Components Div Distribution Assemblies Dept 41 Woodford Ave Plainville Conn (1-2-3) ustaveson Inc 8600 Chestnut St Kansas City 30 Mo (2-3) ctric Co 2255 W Grand Ave Chicago 12 (3) III (3)
I-T-E Circuit Breaker Co 19th & Hamilton Sts
Phila 30 Pa (1-2)
Ideal Electric and Mfg Co East First St Mansfield Ohio (2) merio Unilo (2) Kato Englineering Co 1442 First Ave Mankato Minn (1) Kliegi Bros Universal Electrical Stage Lighting Co Inc 322 W 50 St NY 19 NY (3) Lake Erie Electric Mfg Inc 2952 W 22 St Erie Inc 321 W 50 St NY 19 NY (3) Lake Erie Electric Mfg Inc 2952 W 22 St Erie Pa (1-2-3) Lake Shore Electric Corp 205 Willis St Bedford Ohio (2) Leeds & Northrup Co 4970 Stenton Ave Phila 44 Pa (1) Machinery Electrification Inc 56 Hudson St North-boro Mass (2) Major Equipment Co Inc 4603 W Fullerton Ave Chicago 39 III (3) Marquette Electric Switchboard Co 311 N Des-Marquette Electric Switchboard Coplaines St Chicago 6 III (2)
Minneapolis-Honeywell Regulator CoAve S Minneapolis 8 Minn (1)
Mullenbach Div Electric Machinery Mfg Co 2300 E 27 St Los Angeles 58 Calif (2)
Murray Mfg Corp 1250 Atlantic Ave Brooklyn 16 NY (2)
Nelson Electric Mfg CoP 0 Box 5385 Tulsa Okla (1-2) (1-2)
Parker Electrical Mfg Co 221 Washington St
Oakland 7 Calif (2)
Russell & Stoll Co Inc 125 Barclay St NY 7
NY (2) S & C Electric Co 4435 Ravenswood Ave Chicago 40 III (2) 40 III (2)
Southern Electrical Equipment Co 308 West Bland
at Mint St Charlotte 3 NC (2)
Square D Co 6060 Rivard St Detroit 11 Mich (2-3) Standard Electric Time Co 89 Logan St Springfield 2 Mass (2) 2 Mass (2)
Viking Instruments Inc East Haddam Conn (1)
Westinghouse Electric Corp P 0 Box 868 Pittsburch 30 Pa (1-2)

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1-2)—ADV PG 2d

3D. DISTRIBUTION & SERVICE PANELS

Service entrance panels and local panels for control of power and lighting branch circuits.

Adam (Frank) Electric Co 3647 Windsor Pl St Adam (Frank) Electric Co 3647 Windsor PI St.
Louis Mo
Alwalt Mfg Co 1706 Lapham Dr Modesto Calif
American Electric Switch Div Clark Controller Co
1146 E 152 St Cleveland 10 Ohio
Appleton Electric Co 1701-59 Wellington Ave
Chicago 13 III
BuilDog Electric Products Co 7610 Joseph Campau
Detroit Mich
Clark Controller Co 1146 E 152 St Cleveland
10 Ohio cieveland Switchboard Co 2925 E 79 St Cleveland 4 Ohlo
CONTINENTAL ELECTRIC EQUIPMENT CO Box 1055 Cincinnat 1 Ohio—ADV PG 3rd Cover
CUTLER-HAMMER INC 228 N 12th 5t Milwaukee 1 Wis—ADV PG 118
Pederal Pacific Electric Co 50 Paris St Newark 5 NJ
General Electric Co 50 Paris St Newark 10 Ohio Cleveland Switchboard Co 2925 E 79 St Cleve-

5 NJ
General Electric Co Industrial Power Components
Div Distribution Assemblies Dept 41 Woodford
Ave Plainville Con
General Switch Co 45 Roebling St Brooklyn 11 Gustaveson Inc 8600 Chestnut St Kansas City 30 Mo Kellogg Switchboard and Supply Co 79 W Monroe St Chicago 3 III Kinney Electrical Mfg Co 678 Buckeye St Elgin III Kolton Electric Mfg Co 123 New Jersey Railroad Ave Newark 5 NJ Lake Erie Electric Mfg Inc 2952 W 22 St Erie Machinery Electrification Inc 56 Hudson St North-boro Mass Midwest Electric Products Inc 1515 N Front St Mankato Minn
Mullenbach Div Electric Machinery Mfg Co 2300
E 27 St. Los Angeles 58 Calif
Murray Mfg Corp 1250 Atlantic Ave Brooklyn 16
NY Nelson Electric Mfg Co P O Box 5385 Tulsa Okla Parker Electrical Mfg Co 221 Washington St Oakland 7 Calif
Powercraft Corp 2215 De Kalb St St Louis 4
Mo Pyle-National Co 1344 N Kostner Ave Chicago 51 III Russell & Stoll Co Inc 125 Barclay St NY 7 NY Square D Co 6060 Rivard St Detroit 11 Michigan Sun Electric Products Inc 28 5 Day St Orange NJ V V Fitting Co 711 Cherry St Phila 6 Pennsyl-

WADSWORTH ELECTRIC MFG CO INC 20-34 W
11th St (Box 272) Covington Ky—ADV PG
166-170

166-170

WESTINGHOUSE ELECTRIC CORP P 0 Box 868

Pittsburgh 30 Pa—ADV PG 4

WESTINGHOUSE ELECTRIC SUPPLY C0 3 Gateway
Center Pittsburgh 30 Pa—ADV PG 2d Cover
Young Electric & Mfg Co Inc 2134 Curtis Denver sco Electrical Products 729 Turner Los Angeles 12 Calif

3E. FRAMING & ENCLOSURES

Metal framing members, enclosures, and mounting structures for substation, switch-ing, and control equipment.

Acme Steel Co 135th St & Perry Ave Chicago 27 III 27 III
American Steel & Iron Works 5801 S Lowe Ave
Chicago 21 III
Chicago Wire Iron & Brass Works 2411 W Belmont
Ave Chicago 18 III
Eliza Metal Products Co Box 408 Bridgeville Pa
Faistrom Co 62 Faistrom Ct Passaic NJ
Gustaveson Inc 8600 Chestnut St Kansas City 30 Handy Angle Div Lug-All Co 355 Lancaster Ave Haverford Pa Hoffman Engineering Corp 1050 Tyler St Anoka Minn Hope Electrical Products Co Inc 27 Long Ave Hope Electrical Products to and are found in Hillside Millside North Hillside Signature of the Hillside Signature of the Hilling Signature of the Ohio
Mult-A-Frame Div Ainsworth Precision Castings Co
1471-77 E Atwater St Detroit 7 Mich
Mult-A-Frame Div Ainsworth Mfg Corp 1471-77
E Atwater St Detroit 7 Mich
Parker Electrical Mfg Co 221 Washington St Oakland 7 Calif

Young Electric & Mfg Co Inc 2134 Curtis Denver 2 Colo (1-2-3) Zinsco Electrical Products 729 Turner Los Angeles 12 Calif (1-2-3)

Cover

Queen Products Co Inc Thirteenth & Rowan Sts Louisville 3 Ky Russell & Stoll Co Inc 125 Barclay St NY 7 Spring City Electrical Mfg Co Spring City 85 Pa Steel City Electric Co 1207 Columbus Ave Pitts-burgh 33 Pa Unistrut Products Co 933 Washington Bivd Chi-Unistrut Products to 933 Waamington bird Con-cago 7 III Versabar Corp 14 Whyte St Jersey City NJ Wisconsin Electrical Mfg Co Inc 1237 S Third St Milwaukse 4 Wis Young Electric & Mfg Co Inc 2134 Curtis Denver

3F. PRIMARY SWITCHES

Switches (over 600 v) for distribution pole lines, structures and equipment.

Chance (A B) Co 210 North Allen St Centralia Continental Electric Equipment Co Box 1055 Cin-Continental Electric Equipment Co Box 1055 Cin-cinnati 1 Ohio
Delta-Star Electric Div H K Porter Co Inc 2437 Fulton St Chicago 12 III
Electrical Engineera Equipment Co 25th Ave & Division St Meirose Park III Federal Pacific Electric Co 50 Paris St Newark G & W Electric Specialty Co 3500 W 127 St Blue Island III
General Electric Co Apparatus Sales Div Schenectady 5 NY
GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY rcraft Corp 2215 De Kalb St St Louis 4 Royal Electric Mfg Co 1122 E 87 St Chicago S & C Electric Co 4435 Ravenswood Ave Chicago Southern Electrical Equipment Co 308 West Bland at Mint St. Charlotte 3 NC Square D Co 606 Rivard St. Detroit 11 Michigan Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa

3G. POWER SWITCHES

Automatic transfer Dead-front switchboard Isolating & Interrupting 1. Automatic transr 2. Dead-front switch 3. Isolating & Inter 4. Knife 5. Oil 6. Safety 7. Service entrance 8. Explosion-proof

Switches (600v and less) for general power distribution purposes

Adam (Frank) Electric Co 3647 Windsor Pl St Adam (Frank) Electric Co 3647 Windsor PI St Louis Mo (4-6-7)
Allen-Bradley Co 136 W Greenfield Ave Mil-waukee 4 Wis (1-8)
American Electric Switch Div Clark Controller Co 1146 E 152 St Cleveland 10 Ohio (6-7)
Anderson (Albert & JM) Mfg Co 289 A St Boston 10 Mass (4) Anderson (Alb Anderson (Albert & JMI) Mfg Co 289 A St Boston 10 Mass (4) Appleton Electric Co 1701-59 Wellington Ave Chi-cago 13 III (6) Arrow-Hart & Hegeman Electric Co 103 Hawthorne St Hartford 6 Conn (6-7-8) Automatic Switch Co 50-56 Hanover Rd Florham Pk NJ (1)

Pk NJ (1)

Barber Electric Mfg Co Inc 30 Chestnut St N
Attleboro Mass (4-6-7)

Barkelew Electric Mfg Co 1905 Columbia Ave
Middletown Ohio (2-4)
BullDog Electric Products Co 7610 Joseph Campau
Detroit Mich (6-7)

Clark Controller Co 1146 E 152 St Cleveland 10 Ohio (4-7-8) Connecticut Electric Mfg Co Main St Bantam Conn (4)

•CROUSE-HINDS CO Syracuse 1 NY (6)—ADV PG

●CROUSE-HINDS CO Syracuse 1 NY (6)—ADV PG

96-97

●CUTLER-HAMMER INC 228 N 12th St Milwaukee 1 Wis (1-6-7-8)—ADV PG 118

Delta-Star Electric 10 by H K Porter Co Inc 2437

Fulton St Chicago 12 III (1-6)

Derrick Light & Equipment Co 1201 E Daggett

(P 0 Box 414) Fort Worth Tex (8)

Electro-Snap Switch & Mfg Co 4218-30 W Lake

St Chicago 24 III (8)

6 & W Electric Specialty Co 3500 W 127 St Blue
Island III (1-5)

Gemco Electric Co 25685 W Eight Mile Rd

Detroit 40 Mich (8)

General Electric Co Apparatus Sales Div Schenetady 5 NY (1 thru 6-8)

General Electric Co Industrial Power Components

Div Circuit Protective Devices Dept 41 Woodford Ave Plainville Conn (4-6-8)

General Switch Co 45 Roebling St Brooklyn 11

NY (6-7)

●GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY 17 NY (1-4-5-6-7)—ADV PG 2 Hope Electrical Products Co Inc 27 Long Ave Hillside NJ (8) I-T-E Circuit Breaker Co 19th & Hamilton Sts

I-T-E Circuit Breaker Co 19th & Hamilton Sts Phila 30 Pa (2-3)

I-T-E CIRCUIT BREAKER CO R & IE EQUIPMENT DIV Greensburg Pa (3)—ADV PG 93

Kearney Clames R) Corp 4236 Clayton Ave St Louis 10 Mo (3)

Kolton Electric Mfg Co 123 New Jersey Railroad Ave Newark 5 NJ (6)

Lake Shore Electric Corp 205 Willis St Bedford Ohio (1)

Minnagoulis-Mongowall Regulator Co 2753 Fourth Ohio (1)
Minneapolis-Honeywell Regulator Co 2753 Fourth
Ave S Minneapolis 8 Minn (8)
Monitor Controller Co 99 Grove St Rockland
Mass (1) Murray Mfg Corp 1250 Atlantic Ave Brooklyn 16 NY (6-7) NY (6-7)
Palmer Electric & Mfg Co 24 Water St Wakefield
Mass (1-6-7)
Parker Electrical Mfg Co 221 Washington St Oakland 7 Calif (6-7)
Powercraft Corp 2215 De Kaib St St Louis 4
Mo (3-4) Pringle Electrical Mfg Co 1900-1912 N Sixth St. Phila 22 Pa (3-4-7) Pyle-Mational Co 1344 N Kostner Ave Chicago 51 111 (6-8) sell & Stell Co Inc 125 Barclay St NY 7 NY Sangamo Electric Co 11th & Converse Spring-field III (5) field III (5)

Square D Co 6060 Rivard St Detroit 11 Mich
(1-4-6-7-8)

Unimax Switch Div W L Maxson Corp Ives Rd
Wallingford Conn (8)

V Fitting Co 711 Cherry St Phila 6 Pa
(1-2-3-6)

WADSWORTH ELECTRIC MFG CO INC 20-34 W 11th
St (8ox 272) Covington Ky (4-6-7)—ADV PG
166-170

St (Box 272) 166-170

166-170

166-170

WESTINGHOUSE ELECTRIC CORP P O Box 868
PIttsburgh 30 Pa (6)—ADV PG 77-78-79-80
Westinghouse Electric Corp Standard Control Div
Beaver Pa (6)

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1-2-3-4-5-6-7-8)—
ADV PG 2nd Cover
Young Electric & Mfg Co Inc 2134 Curtis Denver
2 Colo (1-2-3-7)

ZENITH ELECTRIC CO 155 W Walton St Chicago
10 III (1)—ADV PG 176

Zinsce Electrical Products 729 Turner Los Angeles

Zinsco Electrical Products 729 Turner Los Angeles 12 Calif (2-6)

3H. CONTROLS & CONTROL SWITCHES

1. Centraragui
2. Flashing
3. Flow
4. Foet-operated
5. Footmat-operated
6. Koy-operated
7. Limit (lever, toggle or pushbutton)
8. Liquid level (float)

7. Limit (lever, toggue
8. Liquid level (float)
9. Morcury
10. Photoelectric
11. Pressure or vacuum
12. Remote control
13. Rotary tap
14. Timing
15. Miniature
16. Molded power cord

Physically actuated devices performing con-trol functions through the energizing or de-energizing of electrical circuits.

de-energizing of electrical circuits.

A G A Div. Elastic Stop Nut Corp of America 1027
Newark Ave Elizabeth NJ (14)
Abrams Instrument Corp 606 E Shiawasee St
Lansing Mich (10-14)
Abrame Fire Alarm Company Inc 106 Seventh Ave
New York 11 NY (6)
Aemo Inc 10 State St
Mankato Minnesota (2-14)
Aero Inc 10 State St
Mankato Minnesota (2-14)
Aero Instrument Co 11423 Vanowen St North
Hollywood Calif (11)
Alien-Bradley Co 136 W Greenfield Ave
Milwaukee 4 Wis (4-7-8-11-13-14)
Almo Mfg Co 119 Sussex Ave Newark 3 NJ (9)
Arrow-Hart & Hegeman Electric Co 103 Hawthorne
St Hartfard 6 Conn (13)
AutoFYRstop Co 2035 Washington Ave Phila 46
Pa (14) Automatic Control Co 995 4 Minn (3-8-9-11-12-14) 995 University Ave St Paul 4 MINN (3-0-7-11-12-14) Automatic Devices Co Inc 714 Hillgrove Ave West-ern Springs III (14) Automatic Switch Co 50-56 Hanover Rd Florham Pk NJ (2-3-12) utomation Products Inc 3030 Max Roy St Houston 24 Tex (8) totron Co 3629 N Vermillon St Danville III (10-14) Autotron Autorion Co 3629 W Vermitten St. Danvitte III

(10-14)

B/W Controller Corp 2200 E Maple Rd Birmingham Mich (3-8)

Barkelew Electric Mfg Co 1905 Columbia Ave

Middletown Ohio (13)

Barksdale Valves 1566 E Slauson Ave Los Angeles

11 Calif (11)

Beckley Electric Co Inc 468-470 Grand Ave

Brooklyn 3B NY (2)

Bristol Motor Div Vocaline Co of America Inc

Coulter St Old Saybrook Conn (14)

Cincinnati Time Recorder Co 1733 Central Ave

Cincinnati 14 Ohio (14)

Clark Controller Co 1146 E 152 St Cleveland 10 Ohio (4-7-8)
Controls Co of America 2450 N 32 St Milwaukee 45 Wisc (3-11-14)
Convair Inc PO BOX 9671 Pittsburgh 16 Pa (3)
Counter & Control Corp 5225 W Electric Ava Milwaukee 19 Wts
Crouse-Hinds Co Syracuse 1 NY (2)
Cutler-Hammer Inc 228 N 12th St Milwaukee 1 Wis (4-6-7-8-11-12-13-14)
Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III (13)
Dependable-Electric Mfg Co Inc 537 Johnson Ave Brooklyn 37 NY (2)
Detroit Controls Div American-Standard 5900
Trumbull Ave Detroit 8 Mich (11)
Dietz (Henry G) Co Inc 12-16 Astoria Bivd Long Island City 1 NY (3)
Deyen (15 Ny 18-11-14)
Dwyer (F W) Mfg Co Woodland at Greenwood (P 0 Box 373) Michigan City Ind (11)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza South Long Island City 1 NY (2)
Eastern Specialty Co 3617 N 8th St Phila 40 Px (13)
Edoc International Corp 20722 W Seven Mile Rd Detroit 19 Mich (14)

Pa (13)
Edco International Corp 20722 W Seven Mile Rd
Detroit 19 Mich (14)
Electra Mfg Co 4051 Broadway Kansas City Mo
(7-11) (7-11)

Selectric Switch Corp 2320 S Tibbs Ave P 0 Box 41037 Indianapolis 41 Ind (2-9-14)

Electricial Mfg Co 425 Lake Ave Racine Wis (4)

Electro-Cans Switch & Mfg Co 4218-30 W Lake St Chicago 24 III (7-15)

Electronic Control Corp 1573 E Forest Ave Detroit 7 Mich (10)

7 Mich (10)

Mich (20)

M

7 Mich (10)
Euclid Electric & Mfg Co 50 Edwards St Madison
Ohio (1)
Ewald Instruments Box 124P Kent Conn (14)
Exide Industrial Div Electric Storage Battery Co
42 S 15 St Phila 2 Pa (14)
Farmer Electric Products Co Inc 2300 Washington
St Newton Lower Falls 62 Mass (14)
Ferrara Inc 8106 W Nine Mile Rd Oak Park 37
Mich (4)
Eisher-Plerce Co Inc 370 Page 54 South Business

Mich (4)
Fisher-Pierce Co Inc 170 Pearl St South Braintree
85 Mass (10)
Furnas Electric Co 1067 McKee St Batavia III
(447-8-11-13) Electric Mfg Co Inc 237 37th St Brooklyn NY (2) Gemco Electric Co 25685 W Eight Mile Rd Detroit Mich (7)

General Control Co 1200 Soldiers Field Rd Boston 34 Mass (4-17-14) General Controls Co 801 Allen Ave Glendale Calif (3-4-7-9-11-14)

neral Electric Co Air Conditioning Div Home Heating & Cooling Dept Troop Highway Tyler Tex (14)

General Electric Co Apparatus Sales Div Schenec-tady 5 NY (7-8-11-13-14)
Grayhill Inc 551 Hillgrove Ave La Grange III Hankscraft Co Control Div Reedsburg Wis (14) Haydon (A W) Co 232 N Elm St Waterbury Conn (14)

(14)
Haydon Mfg Co Inc 4100 East Elm St Torrington Conn (14)
Hays Mfg Co Industrial Sales Div 12th and Liberty Sts Erle 6 Pa (3)
Healy-Ruff Co Water Level Controls Div 2255 University Ave St Paul 14 Minn (8-11-12)
Heat-Timer Corp 657 Broadway NY 12 NY (14)
Hughey & Phillips Inc 3200 North San Fernando Blvd Burbank Calif (2-10)
Industrial Automation Corp 2415 W Mentrose Ave Chicago III (2-9)

Chicago III (2-9)
INTERNATIONAL REGISTER CO 2620 W Washington Blvd Chicago 12 III (14)—ADV PG 128
Iron Fireman Mfg Co Electronics Div 2838 S E
9th Ave Portland 2 Ore (14)
Jo-Bell Products Inc 5456 W 111 St Oak Lawn
III (32-6) Jordan Electronics 3025 W Mission Rd Alhambra Calif (14)

Calif (14)

Joy Mfg Co Electrical Products Div

1201 Mack
lind Ave St Leuis 10 Mo (16)

Kneisley Electric Co 2501-2509 Lagrange St

Toledo 3 Ohio (13)

Kulka Electric Corp 633 S Fultan Ave Samuel

Vanna Corp 634 S Fultan Ave Samuel

S Fultan Ave S ectric Corp 633 S Fulten Ave Mount NY (2) Vernon NY (2)
Leviton Mfg Co Inc 236 Greenpoint Ave Brooklyn 22 NY (2-7)

Lewis Engineering Co 52 Rubber Ave Naugatuck Conn (13)

Conn (13)
Licon Switch & Control Div Illinois Tool Werks
2501 N Keeler Ave Chicago 39 Ill (7)
Line Material Industries McGraw-Edison Ce 760
W Michigan St Milwaukee Wis (10)
Linemaster Switch Corp Woodstock Conn (4)
Machieny Electrification Inc 56 Hudson St Northboro Mass (8)
Magnetrol Inc 2110 S Marshall Blvd Chicago 23
Ill (3-8-9)

Mailory (P R) & Co Inc 30 S Gray St Indianapolis 6 Ind (14) Manning Maxwell & Moore Inc 250 E Main St Stratford Conn (8-11-12)

McDonnell & Miller Inc 3500 N Spaulding Ave Chicago 18 III (3-8) Mercoid Corp 4201 W Belmont Ave Chicago 41

III (9)
Micro Balancing Inc 191 Herricks Rd Garden
City Park N Y (10)
Micro Switch Div of Minneapolis-Honeywell Regulator Co Chicago & Spring Freeport III

(4-7-9-12-13-15)

 MIDWEST ELECTRIC PRODUCTS INC 1515 N Front St Mankato Minn (14)—ADV PG 172
 Miller Harris Instrument Co 601 E Ogden Ave
 Milwaukee 2 Wis (14) Minneapolis-Honeywell Regulator Co 2753 Fourth Ave S Minneapolis 8 Minn (4-7-9-11-14) Monitor Controller Co 99 Grove St Rockland Mass (7) Monitor Controller to 77
Mass Mass (7)
Mossman (Donald P) Inc Brewster NY (7)
Mossman (Donald P) Inc Brewster NY (7)
Mossman (Donald P) Inc Developer Ny (7)
Mossman (Donald P) Inc Developer Ny (7)
Malional Time & Signal Corp 21800 Wyoming Ave Detroit 37 Mich (14)
Noel Mfg Co 3 W 18 St New York 11 N Y (2) (2) Ohmite Mfg Co 3601 Howard St Skokle III (13)
Paragon Electric Co 1600-12th St Two Rivers
Wis (14) irtiow Corp 2 Campion Rd New Hartford NY (7-10-14) (7-10-14)
Partrick & Wilkins Co 51 N Seventh St Phila 6
Pa (5-6)
Penn Controls Inc Goshen Ind (3-8-11)
Peschel Electronics Inc RFD No 1 Patterson NY
(14) Photobell Co Inc 43 Vesey St New York 7 N Y (10) Dist Machinery Co Electronic Products Div 140 Elliott St Beverly Mass (14) ecora Co Inc 6100 S Archer Rd Summit III

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RELIANCE AUTOMATIC LIGHTING CO 1927 Mead St Racine Wis (14)—ADV PG 174 Reynolds Electric Co 3000 River Rd River Grove III (2) Rhodes (M H) Inc 30 Bartholomew Ave Hartford 6 Conn (14) pley Co Inc Factory St Middletown Conn (10-14) Robot Appliances Inc 7041 Orchard St Dearborn Mich (5) dale Mfg Co Inc 6th & Minor Sts Emmaus Pa (2-8-9-11) Electric Co 11th & Converse Springfield ingamo E III (14)
Sargent Electric Corp 630 Merrick Rd Lynbrook NY (7)
Seely Instrument Co Inc 377 Fourth St (P 0 80x 387) Niagara Falls NY (14)
Shalicross Mfg Co Preston St Selma NC (7-13)
Spencer Thermostat Div Metals & Centrols Corp 34 Ferest St Attleboro Mass (7)
Square D Co 6060 Rivard St Detroit 11 Mich (4-6-7-8-11-12-13-14) Standard Electric Time Co 89 Logan St Springfield 2 Mass (14)
Star-A Electric Mfg Co Inc 269 Meserole St Broeklyn 6 N Y (2) preme Electric Products Co 194 Vassar St Rochester 7 N Y (14) Cholical Electronics Corp 4060 Ince Blvd Culver City Calif (14) City Calif (14)
Tigerman Engineering Co 4332 N Western Ave Chicago 18 III (9)
Tork Time Controls Inc 1000 Grove St Mt Vernon Tork Time NY (14) NY (14)
Unimax Switch Div W L Mausson Corp Ives Rd
Wallingford Cann (4-7)
Vacuum Tube Products Co Inc 2020 Short St
Oceanside Calif (14)
Vemaline Products Co P 0 Box 222 Hawthorne

Warrick (Chas F) Co 1964 W Eleven Mile Rd Berkley Mich (8-9) Weltronic Co 19500 W Eight Mile Rd Detroit 41 Mich (14) Westinghouse Electric Corp Lighting Div 1216
W 58th St (P O Drawer 5817) Cleveland 1 Ohio (2)

Instruments Inc East Haddam Conn (2-5-6-11)
Walser Automatic Timer Corp 420 Lexington Ave
New York 17 N Y (14)
Warrick (Chas F) Co 1964 W Eleven Mile Rd

Viking Instr (2-3-8-11)

Westinghouse Electric Corp Standard Control Div Beaver Pa (7-8-11) Westen Instruments Div of Daystrom Inc Frelinghysen Ave Newark 5 NY (11) White-Rodgers Co 1209 Cass Ave St Louis 6 Mo (7-11-12)

White-Rodgers Co 120° Cass Ave St Louis 6 Mo (7-11-12) Wilson (G C) & Co 1915 Eighth Ave Huntington W Va (14) W Ya 1.37
Winterburn Mfg Co P O Box 386 Putnam Conn (3)
Worner Electronic Devices Rankin III (10)
Zenith Electric Co 155 W Walton St Chicago 10
III (12-14)

3J. EQUIPMENT SWITCHES & CONTROLS

1. Appliance switches

Battery switches & charging controls
 Door & gate openers
 Electric fence controllers

5. Electroplating controls

6 Generator controls

7. Heating system & temperature controls

9. Street-lighting controls

10. Switch-operating mechanisms

11. Welder controls 12. Crane controls

Devices intended for use with specific Items

Alax Electric Co 954 Frankford Ave Phila 23 Pa (7) en-Bradley Co 136 W Greenfield Ave Milwaukee Alliance M Ohio (3) Mfg Co Inc Lake Park Blvd Alliance Ark-Les Switch Corp 51 Water St Watertown
Mass (1) Mass (1)
Arrow-Hart & Hegeman Electric Co 103 Hawthorn
St Hartford 6 Conn (1)
Assembly Products Inc Chesterland 31 Ohlo (7)
Atlas Overhead Door Co Mill St at Reading Rallroad Quakertown Pa (3)
Automatic Control Co 995 University Ave St Paul
4 Minn (7-10)
Automatic Devices Co Inc. 274 Hillogrees Ave. 4 Minn (7-10)
Automatic Devices Co Inc 714 Hillgrove Ave Western Springs III (7)
Becker Bros Carbon Co 3450 So Laramie Ave Cicero 50 III (1)
Berker Bros Carbon Co 3450 So Laramie Ave Queens Village 28 N Y (7)
Bryant Electric Mg Corp 212-40 Jamaica Ave Queens Village 28 N Y (7)
Bryant Electric Co 1421 State St (Box D Barnum Stal Bridgeport 2 Conn (1)
Burling Instrument Co Inc 16 River Rd Chatham N J 7)
N J 7)
N J 7)
N J 7)
N Homberg Drive Knoxville Tenn (7)
Certury Lighting Inc 521 W 43 St New York Tenn (7)
Century Lighting Inc 521 W 43 St New York 36 N Y (8)
Circle F Mfg Co 720 Monmouth St Trenton 4
N J (1-2) Circle F Mig Uo 724 Monage 1 Con 1 C Conn (2)
Controls Co of America 2450 N 32 St Milwaukee
45 Wisc (1-7-10)
Counter & Control Corp 5225 W Electric Ave
Milwaukee 19 Wisc (10)
Crane (H W) Co 15 N 9th Ave Maywood III (3)
Cutler-Hammer Inc 228 N 12th St Milwaukee 1 Cutler-Hammer Wis (1-7-10) Cutier-Hammer inc 228 N 12th St Milwaukee 1 Wis (1.7-10). Day-Ray Products inc 1333 Mission St South Pasadena Calif (8). Delta-Star Electric Div Fulton St Chicago 12 Ill (10). Detroit Controls Div American-Standard 5900 Trumbull Ave Detroit 8 Mich (1.7). Eagle Electric Mfg Co Inc 23-10 Bridge Plaza South Long Island City 1 N Y (1). Ebert Electronics Corp 212-26 Jamaica Ave Queens Village 28 L I N Y (9). Edoc International Corp 20722 W Seven Mile Rd Detroit 19 Mich (1). Edwards Co Inc Norwalk Conn (3). Electric Power Door Co 2127 E Lake St Minneapolis 13 Minn (6). Electric Power Door Co 2127 E Lake St Minneapolis 13 Minn (3). Electric Severice Systems Inc 1330 Quincy St N E Minneapolis 13 Minn (4). Electric Casen Radiator Corp 1 Electric Ave Paris

Minneapolis 13 Minn (4)
Electric Steam Radiator Corp 1 Electric Ave Paris
Ky (7) Electronic Control Corp 1573 E Forest Ave Detroit 7 Mich (3) Electrovector Inc 475 Flushing Ave Brooklyn 5 N Y (7)

N Y (7)
Engelhard (Charles) Inc 850 Passalc Ave East
Newark NJ (7)
Electric Storage Battery Co
42 S 15 St Phila 2 Pa (2)
Federal Pacific Electric Co 50 Paris St Newark 5

Fenwal Inc Pleasant St Ashland Mass (7)
Fisher-Pierce Co Inc 170 Pearl St South Brain-Fisher-Pierce Co Inc. 170 Pearl St. South Brain-tree 85 Mass (9) General Controls Co 801 Allen Ave. Glendale Calif (7)

(7) General Electric Co Apparatus Sales Div Schenec-tady 5 NY (7-9-10)
General Electric Co Construction Materials Div Wiring Device Dept 95 Hathaway St Providence

RI (I)
General Electric Co Industrial Power Components
Div Circuit Protective Devices Dept 41 Woodford Ave Plainville Conn (2)
Graham (Phillip E) Co Inc 1262 Udell St (P 0 Box
5824 Indianapolis 23 Ind (11)
Guardian Electric Mfg Co 1621 W Walnut St Chicago 12 III (1)
HB Instrument Co 4303 American St Phila 40

Pa (7)

Hankscraft Co Control Div Reedsburg Wis (7)

Hankscraft Co Control Div Reedsburg Wis (7)

Harnischfeger Corp 4400 W National Ave Milwauke 46 Wis (12) Hart Mfg Co 164 Batholomew Ave Hartford Conn

Howell Mfg Co 21 N Morehall Rd Paoli Pa (3) Hubbell (Harvey) Inc State St & Bostwick Ave Bridgeport 2 Conn (1-2)

Ideal Electric and Mfg Co East First St Mansfield Ohio (6) Illinois Testing Laboratories Inc 420 N LaSalle St Chicago 10 III (7)

International Electric Fence Co Inc Box 650
Albert Lea Minn (4) Iron Fireman Mfg Co Electronics Div 2838 S E 9th Ave Pertiand 2 Ore (7)

Joslyn Mfg & Supply Co 3700 S Morgan St Chicago 9 III (9)

Kato Engineering Co 1442 First Ave Mankate Minn (6) Minn (6)
Knox Porcelain Corp 2706 Mynders Ave (P 0 Bex 2031) Knoxville 1 Tenn (2)
Kulkas Electric Corp 633 S Pulton Ave Meunt Vernon NY (8)
Lake Shore Electric Corp 205 Willis St Bedfard Ohio (6) Ohio (6)
Leviton Mfo Co Inc 236 Greenpoint Ave Brooklyn
22 NY (1-2)
Line Material Industries McGraw-Edisea Co 766
W Michigan St Milwaukee Wis (9)
Marquette Electric Switchboard Co 311 N Desplaines St Chicago 6 III (6)
Marsh (Jas P) Corp 3501 Howard St Skokle III
(7) cCorkle (D H) Co Box 97 Station A Berkeley Calif (7) McLarty Systems 2600 Dickman Rd Battle Creek Mich (7) Mechanical Industries Production Co 217-225 Ash St Akron 8 Ohio (7) 217-225 Ash Memco Engineering & Mfg Co Inc Commack L I NY (10) ercoid Corp 4201 W Belmont Ave Chicago 41 Micro Baiancing Inc 191 Herricks Rd Garden City Pk NY (9) Micro Switch Div of Minneapolis-Honeywell Regu-lator Co Chicago & Spring Freeport III (1) Micro Switch Div of Minnespolis-Honeywell Regu-lator Co Chicago & Spring Freeport III (1) Minnespolis-Honeywell Regulator Co 2753 Fourth Ave S Minnespolis & Minn (1-76-10) Minnespolis-Honeywell Regulator Co Industrial Div Wayne & Windrim Aves Phila 44 Pac (2) Palmer Electric & Mfg Co 24 Water St Wakefield Mass (7) Palmer Electric & Mfg Co 24 Water St Wakeneld Mass (7) Panellit Inc 7401 N Hamilin Ave Skokie III (6) Pass & Seymour Inc Syracuse 9 NY (1) Penn Controls Inc Goshen Ind (7) Peschel Electronics Inc RFD #1 Patterson NY (2) Photobell Co Inc 43 Vesey St New York 7 NY (9) Precision Thermometer & Instrument Co 1434
Brandywine St Philadelphia 30 Pa (77)
Pyramid Instrument Corp 630 Merrick Rd Lynbrook NY (7) Quincy Mfg Co Box 916 Tiffin Ohle (3) Rhodes (M H) Inc 30 Bartholomew Ave Hartford 6 Conn (1) Ripley Co Inc Factory St Middletown Conn (9) Roberson Inc 1539 E 103 St Seattle 55 Wa abot Appliances Inc 7041 Orchard St Dearborn Mich (3) Sangamo Electric Co 11th & Cenverse Springfield
111 (11) Sargent E NY (1) Electric Corp 630 Merrick Rd Lynbrook Shox-Stok Inc Wellington Ohio (4)
Simplex Co 1139-41 N MacArthur Blvd Springfield
III (6)

III (6)
Slater Electric & Mfg Co Inc 45 Sea Cliff Ave
isen Cove NY (1)
Smith-Gates Carp Farmington Conn (7)
Square D Co 6060 Rivard St Detroit 11 Mich (8)
SUPERIOR ELECTRIC CO 83 Laurel St Bristal
Conn (8)—ADV PG 89-90-91
Taylor-Winfield Corp 1052 Mahoning Ave Warren
Ohio (11)
Tocco Div Ohio Crantchaft Co. 3800 Neward Ave.

Unio (LL)
Toco Div Ohio Crankshaft Co 3800 Harvard Ave
Cleveland 5 Ohio (6)
Trine Mfg Corp 1430 Ferris Place New York 61
NY (3) Ulanet (George) Co 413-15 Market St Newark 5 NJ (7) NJ (7)
United Electric Centrols Co 85 School St Watertown 72 Mass (7)
Yacuum Tube Products Co Inc 2020 Short St
Occanside Calif (11)
Ward Leenard Electric Co 28 South St Mount
Vernon NY (8)

Weksler Instrument Corp 195 E Merrick Rd Free-pert Li NY (7) Weltronic Co 19500 W Eight Mile Rd Detreit 41 Mich (6-11)

Mich. (6-11)
West X Electric Heater Co 390 First St San Francisco 5 Calif (7)
West Instrument Corp 4363 W Montrose Ave Chicago 41 III (7)
WestInshouse Electric Corp P O Box 368 Pittsburgh 30 Pa (7-9)
White-Rodgers Co 1209 Cass Ave St Louis 6 Me (7)

Worner Electronic Devices Rankin III (9)

3K. SPECIAL-FUNCTION CONTROLS

1. Field-discharge switches
2. Frequency controls
3. Interlocks
4. Magnetic amplifiers
5. Program clock systems
6. Saturable reactors
7. Serve components
8. Solenoids
9. Static controls
10. Top changing equipment
11. Valves (electrically operated)
12. Carrier system controls
13. Electric brakes & clutches

Devices intended to accomplish specialized control functions.

Allen-Bradley Co 4 Wis (8)
Allis (Louis) Co 427 East Stewart St Milwaukse
1 Wis (2-4)

Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (1-2-4-6-7-9-11) Rectifier Corp 95 Lafayette St NY 13 NY (13) NY (13) Akkomatic Valve Co Inc 545 W Abbott St Indian-apolis Ind (11) Auth Electric Co Inc 34-20 45th St LIC 1 NY (5)
Automatic Control Co 995 University Ave St Paul 4 Minn (2-5-7)
Automatic Devices Co Inc 714 Hilligrove Ave Western Springs III (5)
Automatic Switch Co 50-56 Hanover Rd Florham Pic NJ (1-8-11)
Avion Div ACF Industries Inc 11 Park Pl Paramus NJ (4-6)
B/W Controller Corp 2200 E Maple Rd Birmingham Mich (8)
Barksdale Wies 5125 Alcoa Ave Los Angeles 58 Calif (11)
Sogue Electric Mfg Co 52 Iowa Ave Paterson 3 (5) Calife (11)

Begue Electric Mfg Co 52 Iowa Ave Paterson 3
NJ (4-7)

Calton Products Co 3518 W Pico Blvd Los Angeles
19 Calif (8-11)

Cincinnati Time. Recorder Co 1733 Central Ave
Cincinnati 14 Ohio (5)

Clark Controller Co 1146 E 152 St Cleveland 10 Ohio (4-11)
Clark-Cooper Co Inc 317 N Market St Palmyra
NJ (11) Electric Co 3349 W Addison Chicago 18 Controls Co of America 2450 N 32 St Milwaukee 45 Wisc (8-11)
Cutler-Hammer Inc 228 N 12th St Milwaukee 1
Wis (3-4-5-8-11-13) Wis (3-4-5-8-11-13)

Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III (3)

Detroit Controls Div American-Standard 5900
Trumbull Ave Detroit 8 Mich (11)

DeWalt Div American Machine & Foundry Co
Fountain Ave Lancaster Pa (13)
Dings Brakes Inc 4740 W Electric Ave Milwaukee
46 Wis (13)

Dormgyer Industries 3430 Milwaukee Dormeyer Industries 3418 Milwaukee Ave Chicago 41 III (8) sert Mfg Corp 249-255 Huron St Brooklyn 22 NY (3)
Edwards Co Inc Norwalk Conn (5)
Electric Regulator Corp Norwalk Conn (2-9)
Electrical Windings Inc 2015 N Kolmar Ave Chicago 39 III (8)
Electro-Snap Switch & Mfg Co 4218-30 W Lake St Chicago 24 III (3)
Federal Sign & Signal Corp 8726 S State St Chicago 19 III (5)
Fischer & Porter Co 335 Warminster Rd Hatboro Pa (11) Gemco Electric Co 25685 W Eight Mile Rd Detroit 40 Mich (4-6-7) General Controls Co 801 Allen Ave Glendale Calif General Electric Co Apparatus Sales Div Schenec-tady 5 NY (1 thru 4—6 thru 10) Guardian Electric Mfg Co 1621 W Walnut St Chi-cago 12 III (8-11) cago 12 III 10-417 Harnischfeger Corp 4400 W National Ave Mil-waukee 46 Wis (13) Hays Mfg Co Industrial Sales Div 12th and Liberty Sts Erle 6 Pa (3-8-11) Hevi Duty Electric Co P 0 Box 563 Milwaukee 1 Wis (6)
Hewson Co Inc 443 Broad St Newark 2 NJ (9)
1-T-E Circuit Breaker Co R & IE Equipment Div Greensburg Pa (3)
International Business Machines Corp Times Equipment Div 590 Madison Ave New York 22 NY (5.12) (5-12) International Register Co 2620 W Washington Blvd Chicago 12 III (5) Leeds & Northrup Co 4970 Stenton Ave Phila 44 Leeds & No Pa (2-6) Leland (G H) Inc 123 Webster St Dayton 2 Ohlo (8)
Lindberg Engineering Co 2450 W Hubbard St Chicago 12 III (6)
Line Material Industries McGraw-Edison Co 700
W Michigan St Milwaukee Wis (10)
Magnatrol Valve Corp 67 Fifth Ave Hawthorne NJ
(11) (11)
Mallory (P R) & Co Inc 30 S Gray St Indianapolis
6 Ind (2)
Manning Maxwell & Moore Inc 250 E Main St
Stratford Conn (11)
Mercold Corp 4201 W Belmont Ave Chicago 41
III (11) III (11)
Minneapolis-Honeywell Regulator Co
Ave S Minneapolis 8 Minn (5)
Minneapolis-Honeywell Regulator Co
Wayne & Windrim Aves Phila 44 Pa (2-7-11)
Moloney Electric Co
20 Mo (10) litor Controller Co 99 Grove St Rockland Mass (B)
National Acme Co Electrical Mfg Div 170 E 131
St Cleveland 8 Ohio (B)
National Time & Signal Corp 21800 Wyoming Ave
Detroit 37 Mich (5)
Pennsylvania Transformer Div McGraw-Edison Co
Box 330 Canonsburg Pa (10)
Pollak (Joseph) Corp 81-95 Freeport St Boston 22
Mass (B) Mass (8)
Raytheon Mfg Co Commercial Equipment Div 100
River St Waltham 54 Mass (4)
Refrigerating Specialties Co 3004 W Lexington St
Chicago 12 Pil (11)

Reliance Electric & Engineering Co 24701 Euclid Ave Cleveland 17 Ohio (4-7) Reuland Electric Co 3001 W Mission Rd Alhambra Calif (13) Ruggles-Klingemann Mfg Co Foster Court Salem Mass (11) Russell & Stoll Co Inc 125 Barclay St N Y 7 NV (3) (3)
Simplex Time Recorder Co 24 S Lincoln St Gardner
Mass (5)
Skinner Chuck Co Skinner Electric Valve Div 95
Edgewood Ave New Britain Conn (11)
Southwestern Industrial Electronics Co 2831 Post
Oak Rd (P 0 Box 13059) Houston 19 Tex (4)
Sperti Faraday Inc 1322 E Church St Adrian
Mich (5) Sperit Paraday Inc 1322 E Church St Adrian Mich (5)
Square D Co 6060 Rivard St Detroit 11 Mich (11) (11)
Standard Electric Time Co 89 Logan St Spring-field 2 Mass (5)
Stearns Electric Corp 120 N Broadway Milwaukee 2 Wis (13)
Stonite Coil Corp U S Hwy 130 Yardville NJ (8) Stonite Coil Corp U S Hwy 130 Yardville NJ (8) Stromberg Time Corp 135 S Main St Thomaston Conn (5)

Conn (5)

SIPERIOR ELECTRIC CO 83 Laurel St Bristol
Conn (4)—ADV PG 92
Superior Interlock Corp 73-39 Central Ave Glendale 27 NY (3)
Supreme Electric Products Co 194 Vassar St
Rochester 7 NY (11)
Taylor-Winfield Corp 1052 Mahoning Ave Warren
Obis (11) Tork Time Controls Inc 1000 Grove St Mt Vernon NY (5)

◆TROMBETTA SOLENOID CORP 329 N Milwaukee St Milwaukee 2 Wis (8-13)—ADV PG 138-174 United States Electronics Corp 275 Warren St Lyndhurst NJ (8) Lyndhurst NJ (8)
Vickers Inc Electric F
St Louis 3 Mo (4) Products Div 1847 Locust St Viking Instruments Inc East Haddam Conn (11)
Weltronic Co 19500 W Eight Mile Rd Detroit 41
Michr (2-3) Westinghouse Electric Corp P 0 Box 868 Pitts-burgh 30 Pa (1-4-8-10) White-Rodgers Co 1209 Cass Ave St Louis 6 Mo Electric Co 155 W Walton St Chicago 10

3L. LOW-VOLTAGE CONTROL SYSTEMS

Low-voltage relays, switches and transform-ers for control of lighting and appliance loads from one or more locations.

Bryant Electric Co 1421 State St (Box D Barnum Sta) Bridgeport 2 Conn Bryant Electric Co 1421 State St (Box D Barnum Sta) Bridgeport 2 Conn (5) General Electric Co Construction Materials Div Wiring Device Dept 95 Hathaway St Providence

Pyramid Instrument Corp Remcon Div 630 Merrick

Rd Lynbrook NY Square D Co 6060 Rivard St Detroit 11 Mich Touch-Plate Mfg Corp Box 1970 Long Beach Calif

3M. MOTOR CONTROLS

Disconnect switches
 Drum switches & controllers
 Magnetic contactors
 Magnetic starters
 Manual starters
 Manual starters
 Pushbutton stations
 Speed regulators & controls
 Mador control centers

Starting, stopping and control equipment for motor circuits.

Adam (Frank) Electric Co 3647 Windsor PI St Louis Mo (1)
Allen-Bradley Co 136 W Greenfield Ave Mill-waukee 4 Wis (2-3-4-5-6-7)
Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (2-3-4-5-6-7)
American Electric Switch Div Clark Controller Co 1146 E 152 St Cleveland 10 Ohio (1)
American Rectifier Corp 95 Lafayette St NY 13 NY (7)
Appleton Electric Co 1701-59 Wellington Ave Chicago 13 III (1-3)
Arrow-Hart & Hegeman Electric Co 103 Hawthorn St Hartford 6 Conn (1-2-3-4-5-6-7)
Automatic Switch Co 50-56 Hanover Rd Florham Pk NJ (3)
B/W Controller Corp 2200 E Maple Rd Birmingham Mich (3-4)
Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ (7)
NJ NJ (7)
BullDog Electric Products Co 7610 Joseph Campau

N J (7) BullDog Electric Products Co 7610 Joseph Campau Detroit Mich (1) Clark Controller Co 1146 E 152 St Cleveland 10 Ohio (2-3-4-5-6-7)

Ohio (2-3-4-5-6-7)

CONTINENTAL ELECTRIC EQUIPMENT CD Box 1055 Cincinnati 1 Ohio (8)—ADV PG 3rd Cover Crouse-Hinds Co Syracuse 1 NY (3-4-5-6)

CUTLER-HAMMER INC 228 N 12th 5t Milwaukee 1 Wis (1-2-3-4-5-6-7)—ADV PG 118

Delco Products Div General Motors Corp 329 E 1st St Dayton 1 Ohio (4)

Delta-Star Electric Div H K Porter Co Inc 2437 Fulton St Chicago 12 III (1) Electric Controller & Mfg Co 4493 Lee Rd Cleve-land 28 Ohio (3-4) land 2B Ohlo (3-4)
Electric Machinery Mfg Co 800 Central Ave
Minneapolis 13 Minn (4-7)
Electric Regulator Corp Norwalk Conn (7)
Electro Devices Inc 116 5 Michigan Ave Chicago 3
III (7) Eliza Metal Products Co Box 408 Bridgeville Pa (6)
Euclid Electric & Mfg Co 50 Edwards St Madison
Ohio (2-3-4-6)
Federal Pacific Electric Co 50 Paris St Newark
5 N J (2-3-4-5-6)
Furn's Electric Co 1067 McKee St Batavia III (2-3-4-6) (2-3-4-6) Gemco Electric Co 25685 W Eight Mile Rd Detroit 40 Mich (4-6-7) General Controls Co 801 Allen Ave Glendale Calif (3-4)
General Electric Co Apparatus Sales Dlv Schenectady 5 N Y (1 thru 7)
General Switch Co 45 Roebling St Brooklyn 11
N Y (1)

GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY 17 NY (1-2-3-4-5-6-7)—ADV PG 2-136 nt 17 nt (1-2-3-9-0-7)—ADV PG 2-136 1-T-E Circuit Breaker Co 19th & Hamilton Sts Phila 30 Pa (1) Ideal Electric and Mfg Co East First St Mans-field Ohio (2-4-5) need Ohio (2-4-5)
Killark Electric Mfg Co 3940 Easton Ave St Louis
13 Mo (1-3-4-5-6)
Kolton Electric Mfg Co 123 New Jersey Railroad
Ave Newark S NJ (1)
Lindel Electric Control Corp 384 Canal St New
York 13 NY (2) York 13 NY (2) Lumenite Electronic Corp 407 S Dearborn St Chl-cago 5 III (3-4) Machinery Electrification Inc 56 Hudson St North-boro Mass (7) Corp 407 S Dearborn St Chiboro Mass (7)
Minneapolis-Honeywell Regulator Co 2753 Fourth
Ave S Minneapolis 8 Minn (6)
Monitor Controller Co 99 Grove St Rockland
Mass (1-3-44-5-6)
Murray Mfg Corp 1250 Atlantic Ave Brooklyn 16
NY (1) NY (1) NY (1)
National Acme Co Electrical Mfg Div 170 E 131
St Cleveland 8 Ohio (5-6)
Nelson Electric Mfg Co P O Box 5385 Tulsa Okla

and Electric Co 69 Murray St NY 7 NY (7) Ilmer Electric & Mfg Co 24 Water St Wakefield Mass (1) Opad Electric Co Mass (1)
Pennsylvania Transformer Div McGraw-Edison Co
Box 330 Canonsburg Pa (1)
Pyle-National Co 1344 N Kostner Ave Chicago 51
III (1.44-6)
R-B-M Div Essex Wire Corp 131 Godfrey St
Logansport Ind (3.4)

Logansport Ind (3-4)
Reliance Electric & Engineering Co 2.4701 Euclid
Ave Cleveland 17 Ohio (7)
Russell & Stoll Co Inc 125 Barclay St NY 7 NY

Care No. 21011 CO INC 125 Barclay St NY 7 NY

(1-45-6)

Servospeed Div Electro Devices Inc 4 Godwin Ave
Paterson NJ (7)

Square D Co 6060 Rivard St Detroit 11 Mich
(1 thru 7)

V Fitting Co 711 Cherry St Phila 6 Pa (1)

Vickers Inc Electric Products Div 1847 Locust St
St Louis 3 Mo (7)

Wac Line Inc 35 S St Clair St Dayton 2 Ohio (7)

Wad Line Inc 35 S St Clair St Dayton 2 Ohio (7)

Wad Line Inc 35 S St Clair St Dayton 2 Ohio (7)

Wad Line Inc 35 S St Clair St Dayton 2 Ohio (7)

Wad Lene Inc 36 S St Clair St Dayton 2 Ohio (7)

Wad Lene Inc 36 S St Clair St Dayton 2 Ohio (7)

Wad Lene Inc 36 S St Clair St Dayton 2 Ohio (7)

Wat Clair St Dayton 2 Ohio (7)

•WESTINGHOUSE ELECTRIC CORP P 0 Box 868
Pittsburgh 30 Pa (1-4-6-8)—ADV PG 77-7879-80 79-80
Westinghouse Electric Corp Standard Control Div Beaver Pa (1 thru 7)

Beaver P. C. thru 77

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway Center Pittsburgh 30 Pa (1-2-3-4-5-6-7-8-ADV P6 2nd Cover Winterburn Mfg Co P 0 Box 386 Putnam Conn (7)

Worner Electronic Devices Rankin III (6)
Zenith Electric Co 155 W Walton St Chicago 10
III (3-4)
Zinsco Electrical Products 729 Turner Los Angeles
12 Calif (8)

3N. RELAYS

General purpose
 Protective
 Timing & time delay

General purpose relays include magnetic and mechanically held types for remote switching of electrical circuits. Protective relays include overload, thermal, under-voltage, phase rotation, etc., relays.

A G A Div Elastic Stop Nut Corp of America 1027
Newark Ave Elizabeth NJ (3)
Abrams Instrument Corp 606 E Shiawasee St
Lansing Mich (3)
Aemoc Inc 10 State St Mankato Minn (1)
Airserco Mfg Co Inc 435 Melwood St Pittsburgh
13 Pa (1)
Allen-Bradley Co 136 W Greenfield Ave
4 Wis (1-2-3)
Allis-Chalmers Mfg Co 930 S 70th St Milwaukee
1 Wis (1-2-3)
Amperite Co Inc 561 Broadway NY 12 NY (3)

Amperite Co Inc 561 Broadway NY 12 NY (3)

Arrow-Hart & Hegeman Electric Co 103 Hawthorn St Hartford 6 Conn (1) Assembly Products Inc Chesterland 31 Ohio (1) Autocall Co 58 Warden Ave Shelby Ohio (1) Automatic Electric Co North Lake III (1-3) Automatic Switch Co 50-56 Hanover Rd Florham De NI (1-2-3) Automatic Switch Pk NJ (1-2-3) B/W Controller Corp 2200 E Maple Rd Birming-ham Mich (2) IV Vocaline Co of America Inc Coulter St Old Saybrook Conn (3) Clare (C P) & Co 3101 Pratt Blvd Chicago 45 III (1) Clark Controller Co 1146 E 152 St Cleveland 10 Ohio (1-2-3) Comar Electric Co 3349 W Addison Chicago 18 rtler-Hammer Inc 228 N 12th St Milwaukee 1 Wis (1-2-3) Wis (1-2-3)
Ebert Electronics Corp 212-26 Jamaica Ave Queens
Village 28 L I NY (1)
Elgin National Watch Co Electronics Div 366 Bluff
City Blvd (Elgin III (1)
Esco Mfg Co P O Box 1039 Greenville Tex (2)
Euclid Electric & Mfg Co 50 Edwards St Madison
Ohio (1-3)
Federal Pacific Electric Co 50 Paris St Newark 5
NJ (2) Federal P. NJ (2)

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Ferrara Inc 8106 W Nine Mile Rd Oak Park 37 eneral Controls Co 801 Allen Ave Glendale Calif (1)
General Electric Co Apparatus Sales Div Schenectady 5 NY (1-2-3)
Guardian Electric Mfg Co 1621 W Walnut St Chicago 12 III (1)
H-B Instrument Co 4303 American St Phila 40
Pa (1) Hankscraft Co Control Div Reedsburg Wis (1)
Haydon (A W) Co 232 N Elm St Waterbury Conn
(3) Haydon Mfg Co Inc 4100 East Elm St Torrington Conn (3)

Conn (3)
Heinemann Electric Co Pennsylvania Ave & Plum
St Trenton 2 NJ (2-3)
Iron Fireman Mfg Co Electronics Div 2838 S E
9th Ave Portland 2 Ore (1)

9th Ave Portland 2 Ore (1)
Jordan Electronics 3025 W Mission Rd Alhambra
Calif (3)
Kurman Electric Co 191-193 Newel St Brooklyn
22 NY (1-2-3)

PLEWUS ELECTRIC CO 1254 W Harrison St Chicago
7 III (1)—ADV PG 165
Machinery Electrification Inc 56 Hudson St Northboro Mass (2-3)
Mercoid Corp 4201 W Belmont Ave Chicago 41
III (1)
Minneanolis-Moneywell Regulator Co. 2753 Fourth

III (1)
Minneapolis-Honeywell Regulator Co 2753 Fourth
Ave S Minneapolis 8 Minn (1-3)
Naybor (E V) Laboratories Inc 26 Manorhaven Blvd
Port Washington NY (3)
Nelson Electric Mfg Co P O Box 5385 Tulsa Okla (3) Ohmite Mfg Co 3601 Howard St Skokie III (1-2)
Palmer Electric & Mfg Co 24 Water St Wakefield

Partrick & Wilkins Co 51 N Seventh St Phila 6 Pa (1)
Penn Controls Inc Goshen Ind (1)
Phillips Control Corp 59 W Washington St Jollet
III (1)

III (1)
Potter & Brumfield Inc Princeton Ind (1)
Price Electric Corp East Church & Second Sts
Frederick Md (1)
R-B-M Div Essex Wire Corp 131 Godfrey St
Logansport Ind (1) Logansport Ind (1)
Rhodes (M H) Inc 30 Bartholomew Ave Hartford 6 Conn (3)

Square D Co 6060 Rivard St Detroit 11 Mich (1-2-3)

(1-2-3)
Struthers-Dunn Inc Pitman N J (1-3)
Sylvania Electric Products Inc 1740 Broadway
N Y 19 N Y (3)
Taitco Div Tait Mfg Co 500 Webster St Dayton
1 Ohio (1)
Terado Co 1068 Raymond Ave St Paul 14 Minn (1) Ulanet (George) Co 413-15 Market St Newark 5 N J (3)

N J (3)
Ward Leonard Electric Co 28 South St Mount
Vernon N Y (1)
Wesix Electric Heater Co 390 First St San
Francisco 5 Calif (1)
Westinghouse Electric Corp Standard Control Div
Beautr Pa (1,2,3)
WESTER CONTROL SUBDIV CO 3 Category Beaver Pa (1-2-3)
 WESTINGHOUSE ELECTRIC SUPPLY CO

Pittsburgh 30 Pa (1-2-3)-ADV PG 2nd Weston Instruments Div of Daystrom Inc 614
Frelinghuysen Ave Newark 5 NJ (1)
White-Rodgers Co 1209 Cass Ave St Louis 6 Mo (1)

Wilson (G C) & Co 1915 Eighth Ave Huntington W Va (3) Electric Co 155 W Walton St Chicago 10 111 (3)

3P. SYSTEM REGULATING EQUIPMENT

Capacitors
 Rheostats & resistors
 Voltage regulators

Capacitors are for power factor control; resistances & rheostats are for control et voltage & current in circuits to motors, elevators, plating equipment, etc.; voltage

regulators control voltage of transmission lines, feeders or specific utilization equip-ment.

Allen-Bradley Co 136 W Greenfield Ave Milwaukee 4 Wis (2) Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (3) American Rectifier Corp 95 Lafayette St New York 13 NY (2-3) Bogue Ele NJ (3) Electric Mfg Co 52 Iowa Ave Paterson 3 NJ (3)
Columbia Electric Mfg Co 4519 Hamilton Ave
Cleveland 14 Ohio (2)
Continental Carbon Div of Wirt Co
St Philadelphia 44 Pa (2)
Cutler-Hammer Inc 228 N 12th St Milwaukee 1 Cutler-Hammer Inc 228 N 12th St Milwaukee 1 Wis (2) Delta-Star Electric Div H K Porter Co Inc 2437 Fulton St Chicago 12 III (3) Electronic Measurements Co Inc Lewis St & Maple Ave Eatontown NJ (3) Everett (E A) Inc 33-15 56th St Woodside 77 NY (2)
Exmet Electrical Corp 127 Marbledale Road P 0
Box 485 Tuckahoe NY (2)
General Electric Co Apparatus Sales Div Schenectago S NY (1-2-3)
Girard-Hopkins 1000 40th Ave Oakland 1 Calif Globar Div Carborundum Co Niagara Falls NY (2) Guyan Machinery Co Inc Box 150 Logan W Va (2) Lake Shore Electric Corp 205 Willis St Bedford Ohio (3)
Line Material Industries McGraw-Edison Co 700
W Michigan St. Milwaukee Wis (3)
Mallory (P R) & Co Inc. 30 S Gray St. Indianapolis 6 Ind (2) apolis 6 Ind (2)

National Electric Controller Co 7070 Glenwood
Ave Chicago 26 III (2)
Ohio Brass Co 380 N Main St Mansfield Ohio (1)
Ohnite Mfg Co 3601 Howard St Skokie III (2)
Pennsylvania Transformer Div McGraw-Edison Co
Box 330 Canonshur 2 (3) Box 330

Div McGraw-Edison Co Pa (3) 30 Canonsburg Pa (3)
Electric Co 11th & Converse Springfield Sangamo III (1) Sorensen & Co Inc Richards Ave South Norwalk Conn (3)

Sprague Electric Co North Adams Mass (1) Superior Electric Co 83 Laurel St Bristol Conn

Tobe Deutschmann Corp Providence Highway Nor-wood Mass (1) Ward Leonard Electric Co 28 South St Mount Vernon NY (2) Weltronic Co 19500 W Eight Mile Rd Detroit 41 Mich (3)

Westinghouse Electric Corp P 0 Box 868 Pitts-buroh 30 Pa (1-2-3) westinghouse pa (1-2-3)

●WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1-2-3)—ADV PG 2nd Center Cover

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

Description, Pages Catalog No. & Mfr. *Code

- 3-1 Service Equipment Loadcenters & Panels; 12p; Cat. No. 2300 (Zinsco)
- 3-2 Power Distribution Equipment; 24p; Cat. No. 106 (Zinsco)
- Stage Lighting Controls; 20p; Cat. No. 107 (Zinsco)
- Transmission, Distribution & Substation Prod-ucts; 240p; Cat. No. 11 (Hughes)
- Controls & Equipment for Internal Combustion Engines; 28p; Cat. No. 646 (Viking)
- 3-6 Relays; 16p; Cat. No. GS3 (Kurman)
- 3-7 Photoelectric Lighting Controls; 50p; (Fisher-Pierce)
- Time Cycle Controllers & Metallic Mercury Switches; 15p; Cat. No. 405 (Electric Switch)
- Bolted Construction for Electrical Installa-tions 64p; Cat. No. 102 (Mult-A-Frame)
- Central Control Systems; 20p; Cat. No. 53-6518 (IBM)

- 3-11 Safety Switches, Service Equipment & Panels; 36p; Cat. No. B5201 (General Switch)
- 3-12 Control Centers; 16p; Cat. No. 6200-2-956
- 3-13 Crane Control; 20p; Cat. No. 9100-1-1257 (Clark)
- 3-14 Switchboards; 12p; Cat. No. 7000 (Young)
- Service Entrance Equipment; 16p; Cat. No. 300 (Young)
- 3-16 Power & Lighting Panelboards; 28p; Cat. No. 500 (Young)
- Residential Panelboards; 12p; Cat. No. S5 (Young)
- 3-18 Valve & Pressure Switch Design Handbook; 64p; Cat. No. 3H11 (Barksdale)
- How to Select and Apply Pressure Switches; 12p; Cat. No. MD7 (Barksdale)
- Power Distribution Systems; 40p; Cat. No. 216 (Standard Electric) 3-21 Precision Electric Timers; 16p; Cat. No. 198
- (Standard Electric) 3-22 Relays, Timers & Flashers; 27p (Aemco)
- 3-23 Motor Control Catalog; 131p; Cat. No. 7 (Allen-Bradley)
- 3-24 Timing Devices; 28p; Cat. No. 3105710 (Haydon)
- Basic Switches for Industrial & Commercial Applications; 28p; Cat. No. 62 (Micro Switch)
- 3-26 Toggle Switches; 12p; Cat. No. 73 (Micro Switch)
- 3-27 Industrial Enclosed Switches; 28p; Cat. No. 83 (Micro Switch)
- 3-28 Mercury Switches; 12p; Cat. No. 90 (Micro
- 3-29 Switches for Industry; 20p; Cat. No. 101 (Micro Switch)
- Electrical Distribution Equipment; 72p; Cat. No. 58 (Murray)
- 3-31 Automatic Controls for Heating & Air Conditioning; 32p; Cat. No. 1508 (Penn Con-
- 3-32 Automatic Controls for Refrigeration & Air Conditioning; 24p; Cat. No. 1487 (Penn Controls)
- 3-33 Control Relays; 40p; Cat. No. 757 (Allied (Control)
- 3-34 Automatic Controls for Heating, Air Conditioning & Refrigeration; 48p; Cat. No. R1558 (White-Rodgers)
- 3-35 Automation Controls; 42p; Cat. No. 608.215 (General Controls)
- 3-36 Capacitors; 34p; Cat. No. 1374H (Ohio Brass)
- Service Equipment Switches & Panelboards; 32p; Cat. No. PL-12-30-1157 (American Electric Switch)
- Photoelectric Controls; 24p; Cat. No. 58 (Autotron)
- 3-39 Safety Switches; 24p; Cat. No. SS260 (Bull-
- Pushmatic Electri-Centers; 48p; Cat. No. PM385 (BullDog)
- 3-41 Indoor Disconnecting Switches; 20p; Cat. No.
- 3-42 Liquid Level Controls; 22p; Cat. No. 340 (Jo-Bell)
- 3-43 Non-Interlocking Light Control Equipment; 16p; Cat. No. L755N (Superior Electric)
- 3-44 Light Control Equipment; 28p; Cat. No. L157 (Superior Electric)
- 3-45 Switches, Panels, Breakers & Troughs; 104p; Cat. No. 58 (Wadsworth)
- Power Capacitors; 12p; Cat. No. PFC 104A (Tobe Deutschmann)
- 3-47 Motor Control Centers; 24p; Cat. No. GEA-4979A (GE)
- Lighting Control Switchboards; 24p; Cat. No. GEA-6168 (GE)
- General Purpose Motor Control Center; 24p; Cat. No. GEA-6367A (GE)

- 3-30 Distribution Switchboards; 32p; Cat. No. 6627 (GE)
- Low-Voltage Distribution Equipment & Com-ponents; 24p; Cat. No. GEC-1032B (GE) 3-51
- Master Time & Program Signaling; 20p; (Cin-cinnati Time) 3-52
- Automatic Controls for Commercial Heating-Ventilating Equipment; 138p; Cat. No. 76-1456 (Minneapolis-Honeywell) 3-53
- 3-54 Automatic Controls for Residential Heating-Ventilating & Air Conditioning; 104p; Cat. No. 76-280 (Minneapolis-Honeywell)
- 3-55 Low-Voltage Power Switchgear; 20p; Cat. No. 6004C (I-T-E)
- Metal-Clad Switchgear; 28p; Cat. No. 70048C 3-56
- 3-57 Floatless Liquid Level Controls; 36p; (B/W)
- Selenoid Valves; 114p; Cat. No. 25 (Automatic Switch) 3-58
- 3-59 Electric Motor Controls; 56p; Cat. No. 5800
- Drum, Foot & Limit Switches; 48p; Cat. No. 5509A (Furnas) 3-60
- Pressure & Float Switches; 24p; Cat. No. 5516B (Furnas) 3-61
- 3-62 Automatic Control with Meter-Relays; 40p; Cat. No. 4D (Assembly)
- 3-63 Integral Primary Unit Substations; 12p; Cat. No. DB-48-250 (Westinghouse)

- 3-64 Standardized Low-Voltage Me Switchgear; 32p; Cnt. No. (Westinghouse) Metal-Enclo
- 3-65 Magnetic Non-Reversing & Reversing Full-Voltage Starters; 16p; Cat. No. DB11-000 (Westinghouse)
- 3-66 Panelboards—Circuit-Breaker Type; 20p; Cat. No. DB30-930 (Westinghouse)
- 3-67 Oil Switches; 44p; Cat. No. DB51 (G&W)
- Limit Switches; 16p; Cat. No. EM-51 (Na-tional Acme)
- 3-69 Solenoids; 27p; Cat. No. EM-52A (National
- 3-70 Meter-Mounting, Switch & Troughing Equipment; 27p (Palmer)
- Electrical Products; 128p; Cat. No. 1958
- 3-72 Interrupter Switches; 30p; Cat. No. 760
- 3-73 Low-Voltage Switch Systems Electrician's Handbook; 24p; Cat. No. HB (Touch-Plate)
- Interlocks; 44p (Superior Interlock) 3-74
- Klixon Precision Switches; 18p; Cat. No. RRSW (Spencer)
- 3-76 Controls for Automatic Gas and Oll Heating; 40p; Cat. No. 500 (Detroit Controls)

- 3-77 Magnetic Amplifiers; 32p; Cat. No. 1105-1 (Vickers)
- 3-78 Low-Voltage Switchgear; 36p; Cat. No. 200 (Continental Electric Equipment)

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the Electrical Products Guide" when ordering. Prices are subject to change.

American Society of Mechanical Engineers, 29 W. 39th St., N. Y. 18, N. Y.: natic Control Terminology, 24p. Price: \$1.50

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: What You Should Know About Today's Electric Con-trols, 50p. Price: 75¢ Electrical Specifications, 1958, 78 pages. Price:

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., New York 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

SECTION 4. PROTECTIVE DEVICES

4A. FUSE CUTOUTS & LINKS

For high-voltage distribution lines.

Chance (A B) Co 210 North Allen St Centralla G & W Electric Specialty Co 3500 W 127 St Blue Island III
General Electric Co Apparatus Sales Div Schenec-General Electric Co Apparatus Sairs bit tady 5 NY
Hubbard & Co 4301 Butler St Pittsburgh 1 Pa
Josiyn Mfg & Supply Co 3700 S Morgan St Chicage 9 III
Kearney Claimes R1 Corp 4236 Clayton Ave St
Louis 10 Mo
Line Material Industries McGraw-Edison Co 700
W Michigan St Milwaukee Wis
S & C Electric Co 4435 Ravenswood Ave Chicago
4n III 40 III USCO Power Equipment Corp 829 N 36th Way Birmingham 4 Ala Birmingham 4 Flashic Corp P 0 Box 868 Pitts-

Westinghouse Electric Corp P 0 Box 868 Pitts-burgh 30 Pa

AB. FUSES

- 1. Cartridge
 2. Current-limiting
 3. Glass tube
 4. Open link
 5. Plug

Cartridge, plug and open-link fuses are for feeder and branch circuit distribution over-load protection; glass tube fuses protect individual devices or instruments; current-limiting fuses limit system short-circuit cur-rents to safe values.

Bussmann Mfg Div McGraw-Ellson Co University at Jefferson St Louis 7 Mo (1-3-4-5) Chase-Shawmut Co 374 Merirmac St Newburyport Mass (1-5)

Mass (1-5)
Commercial Enclosed Fuse Co of N J 6812 Polk
St Guttenbers NJ (1-3-5)
Dependable-Electric Mfg Co Inc 537 Johnson Ave
Brooklyn 37 NY (5)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza
South Long Island City 1 NY (1-3-5)

©ECONOMY FUSE & MFG CO 2717 N Greenview Ave
Chicago 14 III (1-5)—ADV PG 156
Excel Fuse Co 117 W Erie St Pltsburgh 12 Pa
(1)

Gem Electric Mfg Co Inc 237 37th St Brooklyn NY (2.5) meral Electric Co Construction Materials Div Wiring Device Dept 95 Hathaway St Providence

RI (5)
 GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (1-3-4-5)—ADV PG 2-154
Great Western Div Interlectric Corp 1401 Lexington Ave Warren Pa (1)
Litteffuse Inc 1865 Miner St Des Plaines 111 (3)

Monarch Electric Corp 118 E First St Jamestown NY (1-5) Pierce F (1-5) Renewable Fuses Inc Box F Leicester NY (1-5)
S & C Electric Co 4435 Revenswood Ave Chicago 40 III (2)
Cago 40 III (2)
Cago 40 III (2)
Cago 40 III (2) (1) Star-A Electrical Mfg Co Inc 269 Meserole St Brooklyn 6 NY (1-5) Trico Fuse Mfg Co 2948 N 5th St Milwaukee 12 Wis (1) Ware Fuse Corp 4400 W Lake St Chicago 24 III

4C. FUSE ACCESSORIES

Dummy plugs
Fuse clips
Fuse clip clamps
Fuse clip reducers
Fuse cutouts & holders

6. Fuse links 7. Fuse wire strip Supplementary equipment for low-voltage distribution fuses.

Atlas E-E Corp 47 Prospect St Woburn Mass (2)
Bussmann Hfg Div McGraw-Edison Co University
at Jefferson St Louis 7 Mo (1 thru 7)
Chase-Shawmut Co 374 Merrimac St Newburyport
Mass (2-56-7)
Circle F Mfg Co 720 Monmouth St Trenton 4 NJ Commercial Enclosed Fuse Co of N J 6812 Polk St Guttenberg NJ (1-2-3-4-6-7) Connecticut Electric Mfg Co Main St Bantam Conn (5) Conn (5)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza
South Long Island City 1 NY (3-4-6)
Economy Fuse & Mfg Co 2717 N Greenview Ave
Chicago 14 III (3-4-6)
Excel Fuse Co 117 W Erle St Pittsburgh 12 Pa (Z-6)
General Electric Co Apparatus Sales Div Schenectady 5 NY (7)
General Electric Co Construction Materials Div
Wiring Device Dept 95 Hathaway St Previdence
RI (5) RI CJ Great Western Div Interlectric Corp 1401 Lexing-ton Ave Warren Pa (3-6) Hoffman Englineering Corp 1050 Tyler St Anaka Minn (5) Holub Industries Inc 442 Elm St Sycamore III Ideal Industries Inc 5136 Park Ave Sycamore III (3-4)

Knox Porcelain Corp 2706 Mynders Ave (P 0 Box 2031) Knoxville 1 Tenn (5):
Kotlon Electric Mfg Co 123 New Jersey Railroad
Ave Newark 5 NJ (2-4-5)
Kulka Electric Corp 633 5 Fulton Ave Mount
Vernon NY (2)
Martindale Electric Co Monarch Electric Corp 118 E First St Jamestown (2-6) NY (2-6)
Multi Electric Mfg Inc 4223 W Lake St Chicago
24 III (2-5)
Pierce Renewable Fuses Inc Box F Leicester NY Royal Electric Corp 95 Grand Ave Pawtucket Ri Specialtles Inc 2936 Sacramento St Pittsburgh 4 Pa (2) Square D Co 6060 Rivard St Detroit 11 Square 0 to both invariant to perroit 11 Mich (2)
Brooklyn 6 NY (6)
Brooklyn 6 NY (6)
Sylvania Electric Products Inc 1740 Broadway
N Y 19 NY (2)
Trico Fisse Mfg Co 2948 N 5th St Milwaukee 12 Wis (3-4) Ware Fuse Corp 4400 W Lake St Chicago 24 III

4D. CIRCUIT BREAKERS

High voltage
 600v and less
 Explosion-proof

primary and secondary distrib der and branch circuit protection. distribution

Coam (Frank) Electric Co 3647 Windsor Pl St Louis Me (2) Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (1-2)

1 WIS (1-2)
Appletan Electric Co 1701-59 Wellington Ave Chicage 13 III (2)
BuilDog Electric Products Co 7610 Joseph Campau
Detroit Mich (2)
CROUSE-HINDS CO Syracuse 1 NY (2)—ADV PG 96.97

Cutler-Hammer Inc 228 N 12th St Milwaukee 1 Wis (2) Porrick Light & Equipment Co 1201 E Daggett
(P 0 Box 414) Fort Worth Tex (2-3)
Federal Pacific Electric Co 50 Paris St Newark 5 NJ (1-2)

NJ (1-2)
Gemore Electric Co 25685 W Eight Mile Rd Detreit
40 Mich (3)
General Electric Co Apparatus Sales Div Schenectady 5 NY (1-2)
General Electric Co Industrial Power Components
Div Circuit Protective Devices Dept 41 Woodford Ave Plainville Conn (2)
Heinemann Electric Co Pennsylvania Ave & Plum
St Trenton 2 NJ (2)

Ilsco Corp 4730 Madison Rd Cincinnati 27 Ohio

Electrical Products Co Inc 27 Long Ave

Highe Electrical Products Co Inc 27 Long Ave Hillside NJ (2) 1-T-E CIRCUIT BREAKER CO 19th & Hamilton Sts Phila 30 Pa (1-2-3)—ADV PG 95 Killark Electric Mfg Co 3940 Easton Ave St Louis Killiark Electric Mig Co 3940 Easton Ave St Louis
13 Mo (3)
Kolton Electric Mig Co 123 New Jersey Railroad
Ave Newark 5 NJ (2)
Line Material Industries McGraw-Edison Co 700 W
Michigan St Milwaukee Wis (3)
Mechanical Products Inc 1824 River St Jackson
Mich (3) Mich (2)
Murray Mfg Corp 1250 Atlantic Ave Brooklyn 16
NY (2)

Electric Mfg Co P O Box 5385 Tulsa Okla (1-2-3) Pyle-Nation III (2-3) onal Co 1344 N Kostner Ave Chicago 51

Russell & Stoll Co Inc 125 Barclay St NY 7 NY (2.3)no Electric Co 11th & Converse Springfield Sangamo Electric Co 11th & Converse Springheid 111 (2) Square D Co 6060 Rivard St Detroit 11 Mich (1-2-3)

 WADSWORTH ELECTRIC MFG CO INC 11th St (Box 272) Covington Ky PG 138-166-170 NC 20-34 W Ky (2)—ADV Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa (1-2) Westinghouse Electric Corp Standard Control Div Beaver Pa (2)

 WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
 Center Pittsburgh 30 Pa (2-3)—ADV PG 2nd Center Cover

4E. SPECIAL PROTECTIVE EQUIPMENT

Cathodic protective equipment Current-limiting reacters Lightning protective equipment Motor thermal overload devices

Network protectors

Ground rods
Ballast thermal protectors
Motor single-phasing protection

Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 (2-4) Wis (2-47)
Blackburn (Jasper) Corp 1525 Woodson Rd St Louis
14 Mo (6)
Bogue Electric Mfg Co 52 Iowa Ave Paterson 3
N J (2)

N J (2)
Brach Mfg Corp 200 Central Ave Newark 3
N J (3)
Cathodic Protection Service 4601 Stanford St
Houston Tex (1)
Chronoffash Co Oakdale Pa (8)
Copperweld Steel Co Wire and Cable Div Glassport
Pa (3-6)

Pa (3-6) Cutler-Hammer Inc 228 N 12th St Milwaukee 1 Wis (4)

Delta-Star Electric Div H K Porter Co Inc 2437 Fulton St Chicago 12 III (3)

Engelhard (Charles) Inc 850 Passaic Ave East Newark N J (1)
Esco Mfg Co P O Box 1039 Greenville Tex (4-8)
General Cable Corp 420 Lexington Ave NY 17 NY

(1) General Electric Co Apparatus Sales Div Schenec-tady 5 N Y (2-3-4-5) Goetz (J F) Mfg Co 162 South St Hartford Wis (3)

Hubbard & Co 6301 Butler St Pittsburgh 1 Pa (3-6) Color of the Color

9 III (3)
Kearney (James R) Corp 4236 Clayton Ave St
Louis 10 Mo (3)
Kellogg Switchboard and Supply Co 79 W Monroe
St Chicago 3 III (3-6)
Knopp Inc 1307 66th St Oakland 8 Calif (1)
Line Material Industries McGraw-Edison Co 700
W Michigan St Milwaukee Wis (3)
M & W Electric Mfg Co Inc S Walnut St (P O
Box 87) East Palestine Ohio (6)

Murray Mfg Corp 1250 Atlantic Ave Brooklyn 16 N Y (2) Nelson Electric Mfg Co P O Box 5385 Tulsa Okia New Jersey Zinc Co 160 Front St New York 38 NY (1-6)

Ohio Brass Co 380 N Main St Mansfield Ohio (3) Penn-Union Electric Corp 315 State St Erie Pa (6) Pa (6)
Premax Products Div Chisholm-Ryder Co Inc College & Highland Aves Niagara Falls N Y (6)
R T & E Corp 1900 East North St Waukers
Wis (3)
ROME CABLE CORP Ridge St Rome NY (1)—

ADV PG 135

Security Mfg & Contracting Co 606-612 Pine St Burlington Wis (3)

Spencer Thermostat Div Metals & Controls Corp 34 Forest St Attleboro Mass (4-7)

V V Fitting Co 711 Cherry St Phila 6 Pa (6)

(6)

(8)

West inshure. Floriting To 700 Howard St St Louis 6 Mo (6)

(6) Westinghouse Electric Corp P 0 Box 868 Pitts-burgh 30 Pa (2-3-4-5) WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway Center Pittsburgh 30 Pa (2-6)—ADV PG 2nd Center

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

4-1 Fuse Links and How to Use Them; 23p

Low-Voltage Enclosed Circuit Breakers; 52p 4-2

Breakers for Protection of Motor Circuits; 8p; Cat. No. 5040A (1-T-E)

Current-Limiting Circuit Breakers; 8p; Cat. No. 5042A (I-T-E-)

Application of Cordon Circuit Breakers; 19p; Cat. No. 5043A (I-T-E) 4.5

Lightning Arresters; 37p; Cat. No. 1366H (Ohio Brass)

Circuit Breaker Load Centers; 12p; Cat. No. GEA-6661A (G-E) 4-7

Protection Handbook; 24p; Cat. No. SPD 4-8

4-9 Power Fuses; 18p; Cat. No. 261 (S&C)

Klixon Circuit Breakers; 33p; Cat. No. CIRB (Spencer)

Klixon Inherent Overheat Protectors; 24p; Cat. No. MOPR (Spencer)

4-12 Zinc as a Galvanic Anode; 38s; Cat. No. AZI-33-3 (Cathodic Protection)

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the Electrical Products Guide".

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price: \$1.50

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

SECTION 5. WIRING DEVICES AND BOXES

See index for panelboards and other equipment normally housed in cabinets.

Switches other than wiring device switches are listed in Sec. 3.

Hangers and supports for cable and conduit are listed in Sec. 6 & 7, respectively.

Lamp dimmers are listed in Sec. 3.

SA. WIRING DEVICE SWITCHES

- Canopy
 Ceiling pull
 Card
 Delayed action
 Door-operated
 Key-operated
 Lever-operated pull
 Leveline cap
- 7. Lever-spectree purity
 8. Lumiline cap
 9. Mercury
 10. Momentary contact
 11. Oil burner
 12. Pendant
 13. Pushbutton
 14. Rotary

15. Tumbler 16. Weatherproof

Small switches used for general control of lighting and appliance loads in residences, offices, etc.

Arrow-Hart & Hegeman Electric Co 103 Hawthorn St Hartford 6 Conn (1-2-3-6-10-12-13-14-15-16)

8 & M Electric Corp 168 7th St Brooklyn 15 NY Bryant Electric Co 1421 State St (Box D Barnum Sta) Bridgeport 2 Conn (1-2-3-5-8-9-10-12-13-14-15-16)

13-14-15-16)
Circle F Mfg Co 720 Monmouth St Trenton 4 NJ (1-2-3-5-7-8-10-11-12-13-14-15-16)
Cutler-Hammer Inc 228 N 12th St Milwaukee 1 Cutler-Hammer Inc 228 N 121 Wis (5-6-10-11-12-13-14-16)

Wis (5-6-10-11-12-13-14-16)

Eagle Electric Mfg Co Inc 23-10 Bridge Plaza
South Long Island City 1 NY (1-2-5-12-15-16)

Edoo International Corp 20722 W Seven Mile Rd
Detroit 19 Mich (4)

Edwards Co Inc Norwalk Conn (13)

Electro-Snap Switch & Mfg Co 4218-30 W Lake
St Chicage 24 11 (13)

Furnas Electric Co 1067 McKee St Batavia III
(13)

Gem Flectric Mfg Co Inc. 2022 27 15 16

em Electric Mfg Co Inc 237 37th St Brooklyn NY (16) General Electric Co Construction Materials Div

were a clearic Co Construction Materials Div Wiring Device Dept 59 Hathaway St Providence RI (1-3-5-8-9-11-13-14-15-16) Guardian Electric Mg Co 1621 W Walnut St Chi-dard Mg Co 164 Bartholome./ Ave Hartford Com (14-15)

Hoffman Engineering Corp 1050 Tyler St Anoka Minn (16)

●HUBBELL (HARVEY) INC State St & Bostwick Ave Bridgeport 2 Conn (2-3-5-6-8-9-10-11-12-13-14-15-16)—ADV PG 137 3940 Easton Ave St Louis

Killark Electric Mfg Co 3940 Easton Ave St Louis 13 Mo (7-10-12-13-15-16) Kulka Electric Corp 633 S Fulton Ave Mount Ver-non NY (1-3-10) Lee Electric Inc 566 52nd St West New York NJ

(13)Leviton Mfg Co Inc 236 Greenpoint Ave Brooklyn 22 NY (1-2-3-8-9-10-11-12-13-14-15-16) Massey (A H) Inc 111 3rd St (P O Box 206) Derby Conn (15)

Massey 10 Cr. Derby Con (15)
Derby Con (15)
McGill Mfg Co Inc Valparaiso Ind (1-7-10)
McGill Mfg Co Inc Valparaiso Ind (1-7-10)
Micro Switch Div of Minneapolis-Honeywell Regulator
Co Chicago & Spring Freeport III (12)
Minneapolis-Honeywell Regulator Co 2753 Fourth
Ave S Minneapolis 8 Minn (5-9-10-11-12-1374-16)

14-16)
Pass & Seymour Inc Syracuse 9 NY (2-3-5-6-910-12-13-15-16)
Pyramid Instrument Corp 630 Merrick Rd Lynbrook NY (10)

RODALE MFG CO INC 6th & Minor Sts Emmaus
Pa (9-13-15)—ADV PG 151
Russell & Stoll Co Inc 125 Bar.iay St N Y 7 NY
(15-16)

(15-16)

SIERRA ELECTRIC CORP 15100 S Figueroa Gardena Calif (13-15)—ADV PG 130

Slater Electric & Mfg Co Inc. 45 Sea Cliff Ave Glen Cove NY (2-5-6-9-10-11-13-15-16)

Thelier (H J) Corp Ashmont Ave Whitinsville Mass (15) reass (12) Touch-Plate Mfg Corp Box 1970 Long Beach Calif (10) Trine Mfg Corp 1430 Ferris Place New York 61 NY (5)

Wadsworth Electric Mfg Co Inc 20-34 W 11th St Box 272) Covington Ky (5-16) Winterburn Mfg Co P D Box 386 Putnam Conn

5B. CORD CONNECTION DEVICES

aps, plugs, bases & taps, household type

1. Caps, piugs, passe at raps, nousenous type
2. Convenience outlets
3. Multi-outlet assemblies
4. Power cord-connection bodies, heavy duty
5. Range & dryer receptacles
6. Weatherproof outlets
7. Grounding adopters
8. TV antenna outlets
1. TV antenna outlets

Devices for extension of electrical circuits to equipment by means of portable cords.

Adam (Frank) Electric Co 3647 Windsor PI St Louis Mo (2) Appleton Electric Co 1701-59 Wellington Ave Chicago 13 III (1-2-4-6) Arrow-Hart & Hegeman Electric Co 103 Hawthorn St Hartford 6 Conn (1-2-5-4-5-6-7) Automatic & Precision Mfg Co 252 Hawthorne Ave Yonkers S N Y (1) B & M Electric Corp 168 7th St Brooklyn 15 NY (1-2-4) B & M (1-2-4)

(1-2-4)

Beckley Electric Co Inc 468-470 Grand Ave Brooklyn 38 N Y (1-4)

BELL ELECTRIC CO 5735 S Claremont Ave Chicago 36 III (2-4-5-6)—ADV PG 142-166

Black (M) Mfg Co 300-08 N Third St Phila 6

Pa (1) Pa (1)
Bryant Electric Co 1421 State St (Box D
Barnum Sta) Bridgeport 2 Conn (1-2-3-4-5-6)
BuilDog Electric Products Co 7610 Joseph Campau
Detrolt Mich (3) uetroit Mich (3) CBC Electronics Co Inc 2601 N Howard St Phila-delphia 33 Pa (3) Cable Electric Products Inc 234 Daboll St Provi-dence 7 R I (3)

dence 7 R I (3)

Cam-Lok Div Empire Products Inc 9201 Blue Ash Rd (Box 98) Cincinnati 36 Ohio (4-6)
Cannon Electric Co 3208 Humboldt St Los Angeles 31 Calif (4)

GIRCLE F MFG CO 720 Monmouth St Trenton 4 NJ (1-2-3-4-5-6-7)—ADV PG 112
Crouse-Hinds Co Syracuse 1 NY (1-2-3-4-6)
Delta-Star Electric Div H K Porter Co 2437
Fulton St Chicago 12 III (4)
Derrick Light & Equipment Co 1201 E Daggett
(PO 80x 414) Fort Worth Tex (6)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza South Long Island City 1 N Y (1-2-4-5-6)
Ericson Mfg Co 1660 Hayden Ave Cleveland 12
Ohio (1-3-4)
Gem Electric Mfg Co Inc 237 37th Sa Gem Electric Mfg Co Inc 237 37th St Brooklyn N Y (1-2-3-4-5-6) General Electric Co Construction Materials Div

Wiring Device Dept 95 Hathaway St Providence RI (1-2-4-5-6-7) GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY 17 NY (1-2-3-4-5-6)—ADV PG 2 Hessel (W F) Co Inc 74 Beekman St N Y 38 Hessel (W F) N Y (3-4-6) offman Engineering Corp 1050 Tyler St Anoka Minn (3-6) Hopax Electric Inc 547 Greenwich St NY 13 .NY

 HUBBELL (HARVEY) INC State St & Bostwick Ave Bridgeport 2 Conn (1-2-3-4-5-6)—ADV PG 137 Industrial Automation Corp 2415 W Montrose Ave Chicago III (6) Joy Mfg Co Electri Ave St Louis 10

Chicago III (6)
Joy Mfg Co Electrical Products Div 1201 Macklind
Ave St Louis 10 Mo (2-34-6-6)
KILLARK ELECTRIC MFG CO 3940 Easton Ave St
Louis 13 Mo (4-6)—ADV PG 109
Cnox Porcelain Corp 2706 Mynders Ave (P O Box
2031) Knoxville 1 Tenn (1-2-4-5-6)
Line Electric Mfg Co Ince 633 S Fulton Ave

Knox Porceian Grape 2031 Knoxville 1 Tenn (1-2-4-5-6)
Kulka Electric Mfg Co Inc 633 5 Fulton Ave
Mount Vernon NY (1-2)

•LEVITON MFG CO INC 236 Greenpoint Ave Brooklyn 22 NY (1-2-4-5-6)—ADV PG 146
Lew Electric Fittings Co 627 W Lake St Chicago Eaw Electric Fittings to 627 W Lake St Chicago 6 III (2-4-5)

Massey (A H) Inc 111 3rd St (P O Box 206)

Derby Conn (1-2-3-4)

McKinley (Ben P) Co 522 S Clinton St Chicago 7

III (2-4-5)

MIDWEST ELECTRIC PRODUCTS INC 1515 N
Front St Mankato Minn (1-3-4-6)—ADV PG 172

Murray (D A) Co Inc 632 N Mill St Tipton Ind (1)
Natale Machine & Tool Co 339 Highway #17
Carlstadt NJ (1)
PLM Products Inc 3871 W 150 St Cleveland 11 Ohio (4)
Pass & Seymour Inc Syracuse 9 NY (1-2-4-5-6)
Pass & Seymour Inc Syracuse 9 NY (1-2-4-5-6)
Perfect-Line Mfg Corp Old Country Rd & Railroad
Ave P O Box 65 Hicksville L I NY (6)
Pyle-National Co 1344 N Kostner Ave Chicago 51
III (1-3-4-6) Ohio (4) Rab Electric Mfg Co Inc 605 E 132 St New York

Rab Electric Mrg Co Inc 605 E 132 St New York 54 NY (6) Raico Mrg Co 123-141 N Albany Ave Chicago 12 III (1-4)

RODALE MFG CO INC 6th & Minor Sts Emmaus
Pa (1-2-3-4-5-7)—ADV PG 151
Royal Electric Corp 95 Grand Ave Pawtucket RI
(1-2-3-4-5-6-7)
SIERRA ELECTRIC CORP 15100 S Figueroa Gardena Calif (2-5-5)—ADV PG 130
Slater Electric & Mfg Co Inc 45 Sea Cliff Ave
Glen Cove NV (2-4-5-6)
Sta-Tite Mfg Co 2000 Wyandotte Kansas City 8
Mo (1) Mo (1) Standard Electric Time Co 89 Logan St Springfield 2 Mass (1-3) Standard Portable Cord Co Inc Star-A Electric Mfg Co Inc Brooklyn 6 NY (1-2-4-5-6)

Stonco Electric Products Co 333 Monroe Ave Kenilworth NJ (2-6) Kenilworth NJ (2-6)
Tevco Insulated Wire 108 E Prospect Ave Burbank
Calif (8) Calif (8)
Tigerman Engineering Co 4332 N Western Ave
Chicago 18 Ill (6)
Urell Inc 43 Main St Bradford Pa (1)
Wilkoff (M J) Co 823 Locust Pittsburgh 19 Pa

Wiremold Co Hartford 10 Conn (3)
Woodhead (Daniel) Co 15 N Jefferson St Chicago
6 III (1-4)

SC. LAMP ACCESSORIES

Ballasts Ballasts
Bayonet sockets
Bipost sockets
DC fluorescent resistors
Fluorescent lamp capacitors
Fluorescent lamp holders
Fluorescent thermal starters & sockets 8. Locks & guards
9. Lumiline lamp holders
10. Scraw sockets
11. Socket adapters & reducers
12. Quartz lamp holders

Adjustable Fixture Co 104 E Mason St Milwaukee

2 Wis (10)

ADVANCE TRANSFORMER CO 2950 N Western Ave Chicago 18 III (1)—ADV PG 117

Arrow-Hart & Hegeman Electric Co 103 Hawthorn Arrow-Hart & Hegeman Electric Co. 103 Hawthorn St. Hartford & Conn (6-7-8-9-10-11) Benjamin Electric Mfg Co. Northwest Highway & Seegers Rd. Dos Plaines III (3-10-11) Black (M) Mfg Co. 300-08 N Third St. Phila 6 Pa (10) Pa (10)
Bryant Electric Co 1421 State St (Box D Barnum Sta) Bridgeport 2 Conn (3-6-7-8-10-11)
Chadsey Corp P 0 Box 1858 Hartford 1 Conn (8)
Circle F Mfg Co 720 Monmouth St Trenton 4 NJ (3-6-7-8-10-11) (Box D Barnum (3-6-7-8-10-11)
Coil Co of America Inc 207-209 Washington St Northwale NJ (1)
Crouse-Hinds Co Syracuse 1 NY (10)
Day-Ray, Products Inc 1133 Mission St South Pasadena Calif (1-6-7)
Dependable-Electric Mfg Co Inc 537 Johnson Ave Brooklyn 37 NY (5)
Derrick Light & Equipment Co 1201 E Daggett (P O Box 414) Fort Worth Tex (10)
Dialight Corp 60 Stewart St Brooklyn 37 NY (2-10) (2-10)Dura Electric Lamp Co Inc 62 E Bigelow St Newark 8 NJ (7) Duro-Test Corp 2321 Hudson Blvd North Bergen NJ (1-6-7-11) NJ (1-6-7-11)

Bagle Electric Mfg Co Inc 23-10 Bridge Plaza
South Long Island City 1 NY (2-6-8-10-11)

Earl Electric Mfg Corp 35-20 Borden Awe Long
Island City NY (7)

Electric Cord Co 21 Spruce St New York 38 NY Cleveland 12 Ohio (8-10)

Claveland 12 Ohio (8-10)

France Mfg Co 10325 Berea Rd Cleveland 2 Ohio (1) Gem Mfg Co Inc 237 37th St Brooklyn NY (10-11)
General Electric Co Apparatus Sales Div Schenectady 5 NY (1-5)
General Electric Co Construction Materials Div Wiring Device Dept Pt (6-7-9-10-11)
Getsch Lie Construction Materials Div Wiring Device Dept Status NY (10-11) Gets-A-Lite Co 3865 N Milwauxee Ave Chicago 41 Girard-Hopkins 1000 40th Ave Oakland 1 Calif (5)

(5)
Hubbell (Harvey) Inc State St & Bostwick Ave
Bridgeport 2 Conn (6-7-10-11)

JACKSON ELECTRICAL CO 900 W Van Buren St
Chicago 7 III (10)—ADV PG 156 Jefferson Electric Co 25th & Madison Bellwood 111 (1) Kirkland (H R) Co 8 King St Morristown NJ (2-10) (2-10)
Knox Porcelain Corp 2706 Mynders Ave (P 0 Box 2031) Knoxwille 1 Tenn (2-10)
Kulka Electric Corp 6-33 S Fulton Ave Mount Vernon NY (1-2-6-7-10-11)
Laduby Co 3'nc Boston Post Rd (P 0 Box 88)
Branford Conn (8) Lectrohm Inc 5560 Northwest Highway Chicago 30 III (4) Leviton Mfg Co Inc 236 22 N Y (6-7-9-10-11) Marco Industries 207 S Calif (10) Greenpoint Ave Brooklyn dustries 207 S Helena St Anaheim Calif (10)
Marvel Lamp Co 307 Newark St Hoboken
N J (7)
Massey (A H) Inc 111 3rd St (P 0 Box 206)
Derby Conn (10)
McGill Mfg Co Inc Valparaiso Ind (8)
Miskella Infra-Red Co E 73rd & Grand Ave CleveIand 4 Ohio (12)
Morse (Frank W) Co 1300 Soldiers Field Rd
Boston 35 Mass (2-10-11)
Natale Machine & Tool (20 319 Highway #17

Natale Machine & Tool Co 339 Highway #17 Carlstadt N J (8-10-11) Pass & Seymour Inc Syracuse 9 N Y (6-7-10-11)
Pattern Products Co P O Box 135 Union N J (8)
Perfect-Line Mfg Corp Old Country Rd & Railroad
Awe P O Box 65 Hicksville LI 10 NY (10)
Pyle-National Co 1344 N Kostner Ave Chicago Pyle-National 51 III (10)

Radionic Transformer Co 411 S Sangamon St Chicago 7 III (1) Ralico Mfg Co 123-141 N Albany Ave Chicago 12 III (10) Rodale Pa (1-2-10-11) Inc 6th & Minor Sts Emmaus Royal Electric Corp 95 Grand Ave Pawtucket R I (7-10-11)

R 1 (7-10-11)
Slater Electric & Mfg Co Inc 45 Sea Cliff Ave Glen Cove N V (10)
SOLA ELECTRIC CO 4633 W 16th St Chicago 50
III (1)—ADV PG 149
Star-A Electric Mfg Co Inc 269 Meserole St Brooklyn 6 N V (6-7-10-11)
Steel Electric Products Co Inc 5602 18th Ave Brooklyn 4 N V (10-11)
Stratfield Co 4344 Grand St Bridgeport 4 Conn (1)
Surglike Products Co 368 E 148 St New York 55 Products Co 368 E 148 St New York 55 Surelite NY (7) NY (7) weedish Iron & Steel Corp 910 Westfield Ave Elizabeth NJ (1-6) / Iron Electric Products Inc 1740 Broadway N Y 19 N Y (7) / Iron Insulating Co Inc Box 351 Parkersburg Sylvania Union Insulat W Va (10) Universal N N J (1) Mfg Corp 29-51 E 6th St Paterson Ward Leonard Electric Co 28 South St Mount Vernon N Y (4) Westinghouse Electric Corp Lighting Div 1216 W 58th St (P O Drawer 5817) Cleveland 1 Ohio (1) (Daniel) Co 15 N Jefferson St Chicago Woodhead (Daniel 6 III (8-10)

5D. BOXES, WIRING

- Concrete, sidewalk & underground Explosion-proof Floor Interior wall & ceiling
- 5. Non-metallic 6. Pole base 7. Submersible 8. Weatherproof

Boxes for installation of wiring devices, for splices and connectors, and for pulling conductors into raceways. For boxes enclosing equipment, see "Cabinets" in Index.

◆ADALET MFG CO 14300 Lorain Ave Cleveland 11 Ohio (1-2-6-8)—ADV PG 134-146 Adam (Frank) Electric Co 3647 Windsor PI St Louis Mo (3-4)

Louis Mo (3-4)

Alhambra Foundry Co Ltd 1147 Meridian Ave
Alhambra Calif (1-7-8)

•ALL-STEEL EQUIPMENT INC Aurora III (4)—
ADV PG 119

Alwalt Mfg Co 1706 Lapham Dr Modesto Calif
(1-3-7-8)

(1-3-7-8)
Anderson (Albert & JM) Mfg Co 289 A St Boston 10 Mass (1)
Appleton Electric Co 1701-59 Wellington Ave Chicago 13 III (1-2-4-8)
ARROLET CORP Foot of Bower St Montgomery Pa (4-8)—ADV PG 172
ARROW CONDUIT & FITTINGS CORP 129 30th St Brooklyn 32 NY (1-4)—ADV PG 172
Barber Electric Mfg Co Inc 30 Chestnut St N Attleboro Mass (8)
Bell Electric Co 5735 S Claremont Ave Chicago 36 III (8) 36 III (8)
Bowers Mfg Co Inc 6700 Avalon Blvd Los Angeles
3 Calif (4) 3 Calif (4)
Buckles (Chris) Inc 2300 S Springfield Ave Chicago 23 III (4)
Burns (James F) Co 705-715 Cherry St Philadelphia 6 Pa (12-23-47-8)
Calvert Co 19851 Ingersoll Dr Rocky River 16 Calvert Co Ohio (4)

Ohio (4)

Columbia Metal Box Co 260 E 143 St NY 51
NY (4-8)

CROUSE-HINDS CO Syracuse 1 NY (1-2-3-4-5-6-7-8)—ADV PG 96-97

Dependable-Electric Mfg Co Inc 537 Johnson Ave Brooklyn 37 NY (4)

Derrick Light & Equipment Co 1201 E Daggett (P O Box 414) Fort Worth Tex (2-7-8)

Eliza Metal Products Co Box 408 Bridgeville Pa (4) (4)

(4)
Elliott Electric Products Co 1513 Olmstead Ave
New York 62 NY (4)
FULLMAN MFG CO 1209-1215 Jefferson St
Latrobe Pa (3-6)—ADV PG 120
G W Belectric Specialty Co 3500 W 127 St
Blue Island 111 (1-2-7)
General Metals Inc 858 Goldsbro Greensboro NC
40 Mich (2-4-7-8)
General Metals inc 858 Goldsbro Greensboro NC 40 Mich (2-4-7-8)
General Metals Inc 858 Goldsbro Greensboro NC

(8)
GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (4-8)—ADV PG 2
Hoffman Engineering Corp 1050 Tyler St Anoka
Minn (8)

Minn (8)

HOPE ELECTRICAL PRODUCTS CO INC 27 Long
Ave Hillside NJ (1-2-6-7-8)—ADV PG 160-163

HUENEFELD CO Engineered Products Div 2701
Spring Grove Ave Cincinnati 25 Ohio (8)—ADV
PG 140 Ideal-Simplet Fittings Inc 5136 Park Ave Syca-more III (1-4-8) more III (1-4-8)
Kees (F D) Mfg Co 700 Park Ave Beatrice Neb ●KEYSTONE MFG CO 23328 Sherwood Rd Warren Mich (4-8)—ADV PG 131 Killark Electric Mfg Co 3940 Easton Ave St Louis Mo (1-2-8) 13 Mo (1-2-0)

Lew Electric Fittings Co 627 W Lake St Chicago 6 III (3)

Meco Metal Box & Panel Mfg Co Inc 2522 W Huntingdon St Phila 32 Pa (2-8)

MIDWEST ELECTRIC PRODUCTS INC 1515 N Front

TS INC 1515 N Front -ADV PG 172 St Mankato Minn (4-8)—ADV PG 172
National Electric Products Corp Gateway C
140 Stanwix St Pittsburgh 22 Pa (1-3-4)
Nelson Electric Mfg Co P O Box 5385 Tulsa (2-8)

Okla (2-8)

NEWART MFG CO 6825 Machinery Ave Cleveland
Ohio (4)—ADV PG 1.75

0 Z ELECTRICAL MFG CO INC 262 Bond St. Brooklyn 17 NY (1-2-4-7-8)—ADV PG 126 Palmer Electric & Mfg Co 24 Water St Wakefield Palmer Electric & Inny over Mass (7)
Parker Electrical Mfg Co 221 Washington St Oakland 7 Calif (4-8)
Perfect-Line Mfg Corp Old Country Rd & Railroad Ave P O Box 65 Hicksville LI NY

(1-4-8)
Pyle-National Co 1344 N Kostner Ave Chicago
1 II (2-8)
Queen Products Co Inc Thirteenth & Rowan Sts
(2-8)
Pyle-National Co Inc 605 E 132 St New York
A NY (1-2-8)
RIII (2)
Richards (1 12 Co R)
Richards (1 13 Co R) in (2) ichards (J R) Co P O Box 482 Carnegle Pa (1-3-4-5)

Rusgreen Mfg Co 14262 Birwood Ave Detroit 38 Mich (1-2-3-4-7-8) ussell & Stoll Co Inc 125 Barclay St NY 7 .NY (2-4-8) (1-2-3-4-6-7-8) City Electrical Mfg Co Spring City 85 Pa

(1-2-3-4-6-7-8) Steel City Electric Co 1207 Columbus Ave Pitts-burgh 33 Ps (1-3-4) Stonco Electric Products Co 333 Monroe Ave Kenil-worth NJ (4-8) Electric Products Inc 28 S Day St Orange NJ (4)

Superior Porcelain Co 931½ Market St Parkers-burg W Va (5)
Thepitt Mfg Co Gregg & Hammond Sts Carnegle W Va (5)
Mfg Co Gregg & Hammond Sts Carnegle

Union Insulating Co Inc Box 351 Parkersburg W Va (4-5) W Va (4-5) V V Fitting Co 711 Cherry St Phila 6 Williams (H E) Products Co 106 S Carthage Mo (4) Carthage Mo (4) Woodhead (Daniel) Co 15 N Jefferson St Chicago 6 111 (8)

Colo (1-3-8) ic & Mfg Co Inc 2134 Curtis Denver 2

SE. BOX HARDWARE

Covers & plates Hickeys Knockout blanks Studs

5. Supports & hangers
6. Cable-to-box connectors

Accessories used with wiring boxes. See also "Fixture Hangers" and "Conduit Fittings".

Adalet Mfg Co 14300 Lorain Ave Cleveland 11 ALL-STEEL EQUIPMENT INC Aurora III (1-5)-ADV PG 119

Allen-Stevens Conduit Fittings Corp 33-53 62nd St Woodside 77 NY (6) Allied Industries Inc P 0 Box 119 Ogallala Neb (6)

Allied Industries Inc P 0 Box 119 Ogaliala Neb (6)
Anderson Electric Corp P 0 Drawer 2151 Birmingham 1 Ala (6)
Appleton Electric Co 1701-59 Wellington Ave Chicago 13 III (12-35-6)
ARROLET CORP Foot of Bower St Montgomery Pa (13-5)—ADV PG 173
ARROW CONDUIT & FITTINGS CORP 129 30th St Brooklyn 32 NY (1-5)—ADV PG 172
Arrow-Hart & Hegeman Electric Co 103 Hawthorn St Hartford 6 Conn (1)
Badger Die Casting Corp 201 W Oklahoma Ave Milwauker 7 Wis (6)
BELL ELECTRIC CO 5735 S Claremont Ave Chicago 36 III (1)—ADV PG 134
Benjamin Electric Mfg Co Northwest Highway & Seegers Rd Des Plaines III (1)
Blackhaw Industries 250 S Main St Dubuque Iowa (3-5)
Bowert Mfg Co Inc 6700 Avalon Blvd Los Angeles 3 Calif (1-2-3-4-5)
Bryant Electric Co 1421 State St (Box D Barnum

3 Calif (1-2-3-4-5)
Bryant Electric Co 1421 State St (Box D Barnum
Sta) Bridgeport 2 Conn (1)
BUCHANAN ELECTRICAL PRODUCTS CORP 237
U S Route 22 Hillside NJ (3-6)—ADV PG 110
Burns (James F) Co 705-715 Cherry St Philadelphia 6 Pa (1-3-5)
Circle F Mfg Co 720 Monmouth St Trenton 4
NJ (1) rcle F Mrg Co NJ (1) NJ (1) Induit Fittings Corp 6400 W 66th St Chicago 38 Conduit Fits III (4-6) Crouse-Hinds Co Syracuse 1 NY (1-3-5)
Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III (6)

Dossert Mfg Corp 249-255 Huron St Brooklyn 22 NY (6) Duro Fittings Co 2210 S Davie Ave Los Angeles 22 Calif (2-4) 22 Calif (2-4)
South Long Island City 1 NY (1)
Sari Electric Mfg Cop 35-20 Borden Ave Long
Island City NY (1)
Elliott Electric Products Co 1513 Olmstead Ave
New York 62 NY (1 thru 6)
Pa (1-5)
Geffore Electric Co Americas Eldio Padle City NY
Carlos Eldio Padle C

Gedney Electric Co Americas Bldg Radio City NY 20 NY (2-4-6) eneral Electric Co Construction Materials Div Wiring Device Dept 95 Hathaway St Providence RI (1) General Metals Inc 858 Goldsbro Greensboro NC

(1-3-5) alex Die Casting Co 8640 Bessemer Cleveland 27 Halex Die

Heyman Mfg Co Kenilworth 20 Heyman Mfg Co Kenilworth 20 NJ (6)
Hubbell (Harvey) Inc. State St & Bostwick Ave
Bridgeport 2 Conn (1)
Huenefeld Co Engineered Products Div 2701 Spring
Grove Ave Cincinnati 25 Ohio (1)
Ideal-Simplet Fittings Inc 5136 Park Ave Sycamore III (1-3-5)

KEES (F D) MFG CO 700 Park Ave Beatrice Neb
(5)—ADV PG 164
Keystone Mfg Co 23328 Sherwood Rd Warren
Mich (1-5)

(5)—ADV F Keystone Mfg Mich (1-5) Killark Electric Mfg Co 3940 Easton Ave St Louis 13 Mo (6)

Knox Porcelain Corp 2706 Mynders Ave (P 0 Box 2031) Knoxville 1 Tenn (1) Kruse-Rieke Auburn Ind (5) Leviton Mfg Co Inc 236 Greenpoint Ave Brooklyn 22 NY (1)

22 NV (1)
Lew Electric Fittings Co 627 W Lake St Chicago 6 III (1-3)

SLINT (CLYDE W) 2323 W 18 St Chicago 8 III (1-3-5)—ADV PG 170

M & W ELECTRIC MFG CO INC 5 Wainut St (P 0 Box 87 East Palestine Ohio (6)—ADV pg 16-6

PG 165 PG 165
MADISON EQUIPMENT CO 5405 Detroit Ave
Cleveland 2 Ohio (1-2-3-4-5-6)—ADV PG 167
Massey (A H) Inc 111 3rd St (P 0 Box 206)
Derby Conn (1) •MADISON ey (Ben P) Co 522 S Clinton St Chicago 7 McKin 111 (1-5)

Metalectrics Inc 677 Broadway NY 12 NY (2-4-6)Casting Co Inc 47 Grattan St Brooklyn 37 Metro Car NY (6) Midwest Electric Mfg Co 1639 Walnut St Chicago 12 III (2-3-4-6)

12 III (2-3-4-6)
National Electric Products Corp Gateway Center
140 Stamwix St Pittsburgh 22 Pa (6)
NEWART MFG CO 6825 Machinery Ave Cleveland
Ohio (5)—ADV PG 155
0. Z. Electrical Mfg Co Inc 262 Bond St Brooklyn
17 NV (6) NY (6) aine Co Fullerton Ave & Westgate Rd Addison

III (5)
Pass & Seymour Inc
Syracuse 9 NY (1)
Perfect-Line Mfg Corp Old Country Rd & Railroad
Ave P 0 Box 65 Hicksville L1 NY (1)
Pucel Enterprises Inc 3746 Kelley Ave Cleveland
14 Ohio (1)
Pyle-National Co 1344 N Kostner Ave Chicago 51 111 (6) III (6)
Queen Products Co Inc Thirteenth & Rowan Sts
Louisville 3 Ky (1)
Rab Electric Mfg Co Inc 605 E 132 St New
York 54 NY (3)
Rattan Mfg Co 10 Wall St (P 0 Box 1745)
New Haven 7 Conn (2-4-5-6)
Ped Saal Electric Co 13037 Detroit Ave Cleveland

Red Seal Electric Co 10307 Detroit Ave Cleveland Red Seal Electric Co 10307 Detroit Ave Cleveland 2 Ohio (6)
Redi-Bolt Inc 5334 Indianapolis Blvd East Chicago Ind (4-5)
Reichert Float and Mfg Co 2242 Smead Ave Toledo 6 Ohio (3)
Richards (J R) Co P 0 Box 482 Carnegle Pa (1-3-4-5)
Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa (1-6) Rodale (1-6) Royal Electric Corp 95 Grand Ave Pawtucket RI

(1)
Rusgreen Mfg Co 14262 Birwood Ave Detroit 3B Mich (6)
SIERRA ELECTRIC CORP 15100 S Figueroa Gardena Calif (1)—ADV PG 130
Slater Electric & Mfg Co Inc 45 Sea Cliff Ave Glen Cove NY (1)
Spring City Electrical Mfg Co Spring City 85 Pa Star-A Electric Mfg Co Inc 269 Meserole St Brooklyn 6 NY (1) States Co 19 New Park Ave Hartford 6 Conn (6) (6) Steel City Electric Co 1207 Columbus Ave Pitts-burgh 33 Pa (1-2-3-4-5-6) Steel Electric Products Co Inc 5602 18th Ave Brooklyn 4 NY (1-2-3-4-5) Stonco Electric Products Co 333 Monroe Ave Kenilworth NJ (17) Phepitt M Stonco Electric Products Co 333 Monroe As-Kenilworth NJ (1) Thepitt Mfg Co Gregg & Hammond Sts Carnegle

Pa (6)
Thomas & Betts Co 36 Butler St Elizabeth 1
NJ (3-5-6)
Tomic Sales & Engineering Co 2000 Sherwood Ave
Detroit 34 Mich (4)
V Fitting Co 711 Cherry St Phila 6 Pa (1)
Williams (H E) Products Co 106 S Main St
Carthage M Carthage Mo (1-5)

Yorkville Metal Products Co 677 Broadway NY 12 NY (2-4-6)

SF. CABINETS, HOUSINGS & ENCLOSURES

Fuse & cutout
 Meter
 Panelboard
 Switch & circuit breaker
 Transformer

Enclosures only; used for mounting and protection of equipment.

Adam (Frank) Electric Co 3647 Windsor Pl St Louis Mo (1-3-4) Alwalt Mfg Co 1706 Lapham Dr Modesto Calif (1-2-3-5)

(1-2-3-5)
Barber Electric Mfg Co Inc 30 Chestnut St N
Attleboro Mass (1-5)
Burns (James P) Co 705-715 Cherry St delphia 6 Pa (1-2-3-4-5)
Cleveland Switchboard Co 2925 E 79 St Cleveland 40 hio (3)
Code Equipment Sales Co P 0 Box 5847 Philadelphia 28 Pa (2)
Columbia Metal Box Co 260 E 143 St NY 51

NY (1-3-5)
Continental Electric Equipment Co Box 1055
Cincinnati 1 Ohio (3-5)
Crouse-Hinds Co Syracuse 1 NY (1-3-4) Crouse-Hinds Co Syracuse 1 NY (1-3-4)
Cutler-Hammer Inc 228 N 12th St Milwaukee 1

Wis (4) Porrick Light & Equipment Co 1201 E Daggett (P O Box 414) Fort Worth Tex (4)

Eliza Metal Products Co Box 408 Bridgeville Eliza Me Pa (3)

Falstrom Co 62 Falstrom Court Passalc NJ (2-3-4-5) Gemco Electric Co 25685 W Eight Mile Rd Detroit 40 Mich (3-5)

Detroit 40 Mich (3-5)
General Electric Co. Apparatus Sales Div Schenectady 5 NY (2-4)
General Electric Co. Industrial Power Components
Div Distribution Assemblies Dept. 41 Woodford
Ave Plaimville Conn (3-4)
General Metals Inc. 858 Goldsbro. Greensboro. N. C.
(1-2)

(1-2)
Hoffman Engineering Corp 1050 Tyler St Anoka
Minn (1-3-5)
Hope Electrical Products Co Inc 27 Long Ave
Hillside NJ (1-4-5)
HUENEFELD CO ENGINEERED PRODUCTS DIV
2701 Spring Grove Ave Cincinnati 25 Ohio
(1-3-4-5)—ADV PG 140
Kees (F D) Mfg Co 700 Park Ave Beatrice Neb
(2-5)

(2-5)

KEYSTONE MFG CO 23328 Sherwood Rd Warren
Mich (1-2-3-4-5)—ADV PG 131
Killark Electric Mfg Co 3940 Easton Ave St
Louis 13 Mo (3-4-5)
Kolton Electric Mfg Co 123 New Jersey Raliroad
Ave Newark 5 NJ (3-4-5)
Littleford Bros Inc 453 E Pearl St Cincinnati 2
Obic (3-4)

Littleford Bros Inc 453 E Pearl St Cincinnati 2 Ohio (3)

Meco Metal Box & Panel Mfg Co Inc 2522 W Huntingdon St Phila 32 Pa (1-3-5)

MIDWEST ELECTRIC PRODUCTS INC 1515 N Front St Mankato Minn (1-4)—ADV PG 172 Mullenbach Div Electric Machinery Mfg Co 2300 E 27 St Los Angeles 58 Calif (3)

Murray Mfg Corp 1250 Atlantic Ave Brooklyn 16 NY (4)

Nelson Electric Mfg Corp Electric Mfg Co P O Box 5385 Tulsa

Okla (3) Palmer ctric & Mfg Co 24 Water St Wakefield Imer Electr Mass (1-5) rand 7 Calif (1-2-3-4-5)

Pyle-National Co 1344 N Kostner Ave Chicago 51 1ll (3-4)

Queen Products Co Inc Thirteenth & Rowan Sts Louisville 3 Ky (1-2-3-4-5)

Spring City Electrical Mfg Co Spring City 85 Pa (1-2-3-4-5)

Quare D Co 6060 Pinned Co Parker Electrical Mfg Co 221 Washington St Oak-land 7 Calif (1-2-3-4-5) Square D Co 6060 Rivard St Detroit 11 Mich (1-2-3-4-5) Standard Electric Time Co 89 Logan St Spring-field 2 Mass (3) Sun Electric Products Inc 28 S Day St Orange

Sun Electric Products Inc 28 S Day St Orange NJ (1-3-5)
V V Fitting Co 711 Cherry St Phila 6 Pa (1)
WADSWORTH ELECTRIC MFG CO INC 20-34 W
11th St (Box 272) Covington Ky (1-3-4-5)—
ADV PG 138
Westinghouse Electric Corp Standard Control Div Beaver Pa (4)
Young Electric & MFg Co Inc 2134 Curtis Denver 2 Colo (1-2-3-4-5)

5G. FIXTURE HANGERS & SUPPORTS

1. Fixed 2. Disconnecting type

Stems, channels, brackets and chain for permanent support of lighting fixtures. For poles and standards, see index.

Acme Lighting & Mfg Co 949 E 31 St Los Angeles 11 Calif (1) Allen-Stevens Condult Fittings Corp 33-53 62nd St Woodside 77 NY (1) Benjamin Electric Mfg Co Northwest Highway & Seegers Rd Des Plaines III (1) Bowers Mfg Co Inc 6700 Avalon Blvd Los Angeles 3 Calif (1) Crouse-Hinds Co Syracuse 1 NY (1)

Crouse-Hinds Co Syracuse 1 NY (1)
Eagle Mfg Co 3508 Avaion Blvd Los Angeles 11

(1) Calif (1)

Elliott Electric Products Co 1513 Olmstead Ave
New York 62 NY (1)

Federal Shock Mount Corp 1060 Washington Ave
New York 56 NY (1)

Gedney Electric Co Americas Bldg Radio City
NY 20 NY (1)

Hubbard & Co 6301 Butler St Pittsburgh 1 Pa

●IDEAL-SIMPLET FITTINGS INC 5136 Park Ave Sycamore III (1)—ADV PG 176 Jackson Electrical Co 900 W Van Buren St Chicago 7 III (1) Kees (F D) Mfg Co 700 Park Ave Beatrice Neb Killark Electric Mfg Co 3940 Easton Ave St Louis 13 Mo (1)

KIllark Electric Mfg Co 3940 Easton Ave St Louis 13 Mo (1)

MADISON EQUIPMENT CO 5405 Detroit Ave Cleveland 2 Ohio (1)—ADV PG 167

Metalectrics Inc 677 Broadway NY 12 NY (1)
Mult-A-Frame Div Alinsworth Precision Castings Co 1471-77 E Atwater St Detroit 7 Mich (1)
Mult Electric Mfg Inc 4223 W Lake St Chicago 24 III (1)
Natale Machine & Tool Co 339 Highway #17
Caristadt NJ (1)
Paine Co Fullerton Ave & Westgate Rd Addison III (1)
Pyle-National Co 1346 N Kostner Ave Chicago 51

yle-National Co 1344 N Kostner Ave Chicago 51 Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa

(1) Steel City Electric Co 1207 Columbus Ave Pitts-burgh 33 Pa (1) Steel Electric Products Co Inc 5602 18th Ave Brooklyn 4 NY (1) Thompson Electric Co P 0 Box 873 Cleveland 22 Ohlo (2) Tomic Sales & Engineering Co 20000 Sherwood Ave Detroit 34 Mich (1) Unistrut Products Co 933 Washington Blvd Chicage 7 III (1)

Unistrut Products of Page 11 (1) 14 Whyte St Jersey City NJ (1) Versabar Corp 14 (1) 14 Whyte St Jersey City NJ (1) Versabar Corp P O Box 868 Pittsburgh 30 Pa (1) Testinghouse Electric Corp Lighting Div 1216 W 58th St (P O Drawer 5817) Cleveland 1 Ohio (1)

Ohio (1)
Wil-Son Mfg Co Cloverport Ky (1)
Yorkville Metal Products Co 677 Broadway NY 12

5H. METER SOCKETS & MOUNTINGS

Sockets, troughs and accessories for kw-hr meters. See Sec. 5F for meter cabinets.

Anchor Mfg Co P O Box 959 Manchester N+ Code Equipment Sales Co P O Box 5847 Phila NH Anchor May
Code Equipment Sales Co r
Code Equipment Sales Co r
delpina 28 Pa
General Electric Co Apparatus Sales Div Schenectady 5 NY
tady 5 NY
1250 Atlantic Ave Brooklyn

Murray Marg Corp 16 NY
Palmer Electric & Mfg Co 24 Water St Wakefield Mass
Westinghouse Electric Corp P O Box 868 Pittsburgh 30 Pa

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

* Code Description, Pages Catalog No. & Mfr.

5-1 Electrical Specialties, 24p (Ericson)

5-2 Meter Enclosures & Equipment; 20p; Cat. No. 20 (Kees)

Wiring Devices; 153p; Cat. No. 29 (Hubbell)

Boxes, Wiring Troughs & Cabinets; 18p; Cat. No. 3-A (General Metals) 5-4

Receptacles & Plugs; 8p; Cat. No. 238 (Standard Electric) 5-5

5-6 Boxes & Fittings; 20p; Cat. No. 158 (Lew)

Boxes, Covers & Hangers; 40p; Cat. No. BC-657 (All-Steel) 5.7

Heavy Duty Plugs & Receptacles; 26p; Cat. No. 49 (Hessel) 5-8

5-9 Boxes, Hangers & Fittings; 30p (Arrolet)

Boxes, Cabinets & Housings; 16p; Cat. No. 23 (Columbia Metal) 5-10

5-11 Fluorescent Ballast Cross Index Replacement Guide; 2p (Universal)

5-12 Boxes & Covers; 36p; Cat. No. 18-335 (G-E)

Electrical Enclosures; 16p; Cat. No. 1958

Plugs & Receptacles; 20p; Cat. No. 40D (Anderson) 5-14

Heavy Duty Plugs & Receptacles; 16p; Cat. No. 46C (Anderson) 5-15

Cable Boxes; 20p; Cat. No. AB-55 (G&W)

Wiring Devices: 64p: Cat. No. 57 (Rodale) 5-17

Switches, Outlet Boxes & Fittings; 65p; Cat. No. J (Steel City)

Boxes, Cabinets & Enclosures; 16p; Cat. No. 157-B (Keystone) 5-19

Outlet Boxes & Switch Boxes; 12p; Cat. No. 157-C (Keystone)

Junction Boxes, Cabinets & Explosion-Proof Housings; 24p; Cat. No. 10 (Spring City) 5-21

Electrical Wiring Devices; 100p; Cat. No. 56 (Leviton)

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the Electrical Products Guide" when ordering. Prices are subject to change.

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price: \$1.50

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

SECTION 6. CONDUCTORS AND CONNECTORS

14. RUW-moisture-resistant latex rubber

14. RUW—moisture-resistant (atex rubber 15. SB—slow-burning 16. SE, ASE, USE—service entrance 17. T—thermoplastic 18. TA—thermoplastic a asbesto 19. TW—moisture-resistant thermoplastic 20. UF—underground feeder & branch circuit

Accurate Insulated Wire Corp 25 Fox St New Haven 13 Conn (8-17-19)
Acorn Insulated Wire Co 36 Freeman St Pawtucket RI (1-2-4-6-8-9-10-11-16-17-18-19-20-

American Electric Cable Co 181 Appleton St Holyoke Mass (19)

Holyoke Mass (19) American Insulated Wire Corp 36 Freeman St Pawtucket RI (1-2-4-6-8-9-10-11-17-18-19-20-

21-22)
American Metal Moulding Co 146 Colt St Irvington NJ (2-3-19)

MMERICAN STEEL & WIRE DIV UNITED STATES
STEEL CORP Rockefeller Bidg Cleveland 13
Ohio (1-3-7-8-9-10-11-15-16-17-18-19-20-21-22)

—ADV PGS 85-86-87-88
Anaconda Wire & Cable Co. 25 Broadway. New

Anaconda Wire & Cable Co 25 Broadway New York 4 NY (4-6-7-8-9-10-11-16-17-18-19-20-21-22)

cuit
21. vernished cambric
22. WP—weatherproof

tucket 21)

Wire and cable are listed in 6A, 6B and 6C by code letter designations used in the National Electrical Code: Sections 6D and 6E list applications.

Wire and cable tools are listed in 12B; underground supports, poles, etc. in Sec. 1; raceways and enclosures in Sec. 7.

6A. BUILDING & POWER CABLE

- 4. AVA, AVB, AVL—asbestos & varnished cambric
 5. MI—Minoral-insulated, metal-sheathed
 6. NM, NMC—non-metallic sheathed
 7. Paper, underground service
 8. R—Code rubber
 9. RH, RHH—heat-resistant rubber
 10. RH-RW, RHW—moisture-& heat-resistant rubber
 11. RW—moisture-resistant rubber
 12. RU—latex rubber
 13. RUH—heat-resistant latex rubber
- A, AA, AI, AIA—asbestos
 AC, ACT, ACV—armored cable
 ACL—armored cable, lead-covered
 AVA, AVB, AVL—asbestos & varnished
- (2-3-6-17-20-22) Cakland Ave Chester NY Circle Wire and Cable Corp 5500 Maspeth Ave Maspeth LI NY (2-3-6-8-9-10-11-16-17-19-20-

COLLYER INSULATED WIRE CO 249 Roosevelt Ave Pawtucket RI (1-4-6-8-9-10-11-16 thru ADV PG 121 AUV PG 121 Columbia Cable & Electric Corp 255 Chestnut St Brooklyn 8 NY (2-3-6-17-19-20) Continental Wire Corp 560 Maryland Ave York Pa (1-4-17-18-19-20-21) Copperweld Steel Co Wire and Cable Div Glassport Pa (22)

Pa (22)
Cornish Wire Co Inc. 50 Church St. NY 7 NY (17)
CORESCENT INSULATED WIRE CABLE CO 319 N
Olden Ave Trenton 5 NJ (2-3-6-8-9-10-11-1617-19-20-21)—ADV PG 127
Diamond Wire & Cable Co 445 Park Ave Sycamore III (2-3-17-20-22)
Ettco Wire & Cable Corp 75 Onderdonk Ave Brooklyn 37 NY (2-6-16-17-19-20)
GENERAL CABLE CORP 420 Lexington Ave New
YORK 17 NY (1 thru 11-16 thru 22)—ADV
PG 148

YORK 17 NV 11 time 12-20 Since 1976 148 PG 148 PG 148 Per 1976 149 PG 148 PG 14

Atfield Wire and Cable Div Continental Copper & Steel Indus Inc 487 Hillside Ave Hillside 5 NJ (2-6-8-9-10-11-16-17-19-20)

Kaiser Aluminum & Chemical Sales Inc 919 N Michigan Ave Chicago 11 III (1-2-3-6-8 thru 14-16-17-19-20) Kennecott Wire and Cable Co Phillipsdale (Rum-ford 16) RI (3-7-15-21-22) Narragansett Wire Co 541 Pawtucket Ave Paw-

arraganset Wire Co 541 Pawtucket Ave Pawtucket RI (6-9-10-11-16-17-19-20-22) attional Electric Products Corp Gateway Center 140 Stanwix St. Pittsburgh 22 Pa (1-2-3-4-6-7-8-9-10-11-2-13-14-16 thru 22) elson Electric Mfg Co P O Box 5385 Tulsa Nelson Electric Mfg Co Okla (5)

OKRIA (5)

NORMANDY ELECTRIC WIRE CORP 125 Second
St Brooklyn 31 NY (2)—ADV PG 174

Okonite Co Passaic NJ (1-4-7-9-10-11-16-19-21-22)

21-22)
Paranite Wire & Cable Div Essex Wire Corp 1601
Wall St Fort Wayne 6 Ind (2-3-6-8-9-10-1116-17-19-20-22)
PHELPS DDDGE COPPER PRODUCTS CORP 300
Park Ave New York 22 NY (1-3-4-7-8-9-1011-15-17 thru 22)—ADV PG 98-99

Plastic Wire & Cable Corp E Main St Jewett City Conn (17-19-20) lastoid Corp 42-61 24th St L 1 C 1 NY (1-17-18-19-20) Radix Wire Co 26260 Lakeland Blvd Cleveland 32 Ohio (1-2-4-6-17-18-19-20) de Island Insulated Wire Co Inc 50 Burnham

Ave uranston RI (1-0-17-21)
Rockbestos Products Corp Nicoll and Canner Sts
New Haven 4 Conn (1-2-4-18-21)
Robbling's (John A) Sons Corp 640 S Broad St
Trenten 2 NJ (7-9-10-11-16-17-19-20-21-22)
ROME CABLE CORP Ridge St Rome NY (6-89-10-11-16-17-19-20-22)—ADV PG 135
Royal Electric Corp 95 Grand Ave Pawtucket

Electric Corp

ROYAL ELECTIC CORP A GREAT AND ASSESSED AS A GREAT AND ASSESSED AS A GREAT AND ASSESSED ASSES

Western Insulated Wire Co 2425 E 30th St L Angeles 58 Calif (1-2-3-4-6-9-10-11-16-21)

6B. FIXTURE WIRE

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Div

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B. FIXTURE WIRE

1. AF—heat-resistant asbestos-covered
2. CF—heat-resistant cotton-covered
3. FF—rubber-covered flexible stranding
4. FFH—heat-resistant rubber-covered
flexible stranding
5. RF—rubber-covered, solid or 7-strand
6. RFH—heat-resistant rubber-covered,
solid or 7-strand
7. SF—silicone rubber, solid or 7-strand
8. SFF—silicone rubber, solid or 7-strand
9. TF—thermoplastic-covered, solid or
stranding
10. FFF—thermoplastic-covered, flexible
stranding
Accurate Insulated Wire Corp. 25. Fev. St. New

Accurate Insulated Wire Corp 25 Fox St New Haven 13 Conn (5-9-10) Acorn Insulated Wire Co 36 Freeman St Pawtucket RI (1 thru 6-9-10)

RI (1 thru 6-9-10)
American Electric Cable Co 181 Appleton St
Holyoke Mass (9-10)
American Insulated Wire Corp 36 Freeman St
Pawtucket RI (1 thru 6-9-10)

MMERICAN STEEL & WIRE DIV UNITED STATES
STEEL CORP Rockefeller Bidg Cleveland 13
Ohio (1-2-4-5-6-9-10)—ADV PG 85-86-87-88 nda Wire & Cable Co 25 Broadway NY (9-10) Apex Wire & Cabl 32 NY (9-10) Cable Corp 237 37th St Brooklyn

Brand (William) & Co Inc 51 North St Williman-Conn (9-10)
Cable Corp Oakland Ave Chester NY

(Y-LU)

Gircle Wire and Cable Corp 5500 Maspeth Ave
Masceth Li NY (2 thru 6-9-LU)

COLLYER INSULATED WIRE CO 249 Roosevelt
Ave Pawtucket RI (1-3-4-5-6-7-8-9-10)—ADV
PG 121 Continental Wire Corp 560 Maryland Ave York Pa (1-2-7-8-9-10)

Pa (1-2-7-8-9-10)
Cornish Wire Co Inc 50 Church St N Y 7 NY
(3-9-310)
CRESCENT INSULATED WIRE & CABLE CO 319
N Olden Ave Trenton 5 NJ (3-4-5-6-9-10)
ADV PG 127

ADV PG 127 iamond Wire & Cable Co 445 Park Ave Sycamore III (1 thru 10) tto Wire & Cable Corp 75 Onderdonk Ave Brooklyn 37 NY (9) NFRAL CABLE CORP 420 Lexington Ave New York 17 NY (1-2-3-4-5-6-7-8-9-10)—ADV PG 148 **GENERAL** York 17 148

148
General Electric Co Construction Materials Div Wire & Cable Dept 1285 Boston Ave Bridgepert 2 Conn (1-3-4-7-8-9-10)
General Insulated Wire Works Inc 69 Gordon Ave Providence 5 RI (9-10)
Hatfield Wire and Cable Div Continental Copper & Steel Indus Inc 487 Hillside Ave Hillside 5 NJ (3-4-5-6-7-8-9-10)
Kaiser Aluminum & Chemical Sales Inc 919 N Michigan Ave Chicago 11 III (1-2-3-4-5-6-7-8-9-10)
Lewis Engineering Co 52 Rubber Ave Nauastuck

Lewis Engineering Co 52 Rubber Ave Naugatuck
Conn (1) Narragansett Wire Co 541 Pawtucket Ave Paw-tucket RI (9-10)

Narragansett wire to tucket RI (9-10)
National Electric Products Corp Gateway Center
140 Stanwix St Pittsburgh 22 Pa (1 thru 10)
Okonite Co Passaic NJ (1-3-4-5-6-8-9-10)
Paranite Wire & Cable Div Essex Wire Corp 1601
Wall St Fort Wayne 6 Ind (5 thru 10)
Phalo Plastics Corp 25 Foster St Worcester 8
Mass (9-10)

PHELPS DOBGE COPPER PRODUCTS CORP 300
Park Ave New York 22 NY (1-3-4-5-6-9-10)
ADV PG 98-99

Plastic Wire & Cable Corp E Main St Jewett City Conn (9-10) Plastoid Corp 42-61 24th St L I C 1 NY (9-10)
Radix Wire Co 26260 Lakeland Blvd Cleveland 32
Ohio (1-9-10)

Rockbestos Products Corp Nicoll and Canner Sts New Haven 4 Conn (1) PROME CABLE CORP Ridge St Rome NY (3-4-5-6-9-10)—ADV PG 135 Royal Electric Corp 95 Grand Ave Pawtucket RI (1-2-3-9-10)

●SIMPLEX WIRE & CABLE CO 79 Sidney St Cambridge 39 Mass (3-4-5-6-7-8-9-10)—ADV PG 115
Southwire Co Carrollton Ga (9)
Surprenant Mfg Co 199 Washington St Boston 8
Mass (9-10)
Times Wire & Cable Co Waslingford Conn (9-10)
Victor Electric Wire & Cable Corp 618 Main St
West Warwick RI (9-10)

"MALKER BROTHERS End St Conshohocken Pa
(9-10)—ADV PG 141
Western Insulated Wire Co 2425 E 30th St Los
Angeles 58 Calif (1-4)

6C. FLEXIBLE CORD

AFC, AFPD, AFPO—asbestos-covered, heat-resistant
 AFS, AFSJ—rubber-jacketed, heat-re-sistant

3. AVPD, AVPO-heat- and moisture-resistant 3. AVPD, AVPO—hear- and morstand
4. C—lamp
5. CA—armored
6. CFC, CFPO, CFPO—cotton-covered,
hear-resistant
7. E, EO, ET—elevator cable
8. HC, HPD—heater
9. HPN—heater, all neoprene
10. HS—heater, lacketed
11. HSJ—heater, rubber-jacketed
12. K—heavy-duty, braided
13. P—reinforced
14. PD—twisted portable
15. PO—parellel
16. PW—reinforced, moistureproof
17. S, SO, ST—hard service
18. SJ, SJO, SJT—hard service, junior
19. SP—parallel, all rubber
20. SPT—parallel, all plastic
21. SR, SRT—range cable
22. SV, SVT—vacuum cleaner
23. TP, TPT, TS, TST—tinsel
Accurate Insulated Wire Corp 25 Fox St New

Wire Corp 25 Fox St New (2-4-7-8-9-10-11-12-13-14-15-Haven 13 Conn (2-4-7-8 16-17-18-19-20-21-22-23) Acorn Insulated Wire Co 36 Freeman St Pawtucket RI (1-3-4-6-8 thru 22)

nerican Electric Cable Co 181 Appleton St Holyoke Mass (4-8-15-18-20-22)
merican Insulated Wire Corp 36 Freeman St
18-19-20-22)
WREICAN CORP.

AMERICAN STEEL & WIRE DIV UNITED STATES STEEL CORP Rockefeller Bldg Cleveland 13 Ohio (1-7-17-18) — ADV PG 85-66-87-88 Anaconda Wire & Cable Co 25 Broadway New York 4 NY (12-17-18)

Apex Wire & Cable Corp 237 37th St Brooklyn 32 NY (8-15-20)

B & M Electric Corp 168 7th St Brooklyn 15 NY (4-6-8-9-18-19-20-22) elden Mfg Co P D Box 5070A Chicago 80 III (8-9-10-11-17-18-19-20-21-22-23) hester Cable Corp Oakland Ave Chester NY (8-17-18-20-22)

(8-17-18-20-22)

Circle Wire and Cable Corp 5500 Maspeth Ave Maspeth L I NY (4-5-12-13-14-17-18-19-20-21)

COLLYER INSULATED WIRE CO 249 Rossevelt Ave Pawtucket RI (1-2-3-4-7-12-13-14-15-16-17-18-20-21-22)—ADV PG 121

Columbia Cable & Electric Corp 255 Chestnut St Brooklyn 8 NY (5)

Continental Wire Corp 560 Maryland Ave York Pa (1-3-4)

Pa (1-3-6) Pa (1-3-6)
Cornish Wire Co Inc 50 Church St N Y 7 NY
(4-8-9-11-15-17-18-20-22)
CRESCENT INSULATED WIRE & CABLE CO 319
N Olden ave Trenton 5 NJ (4-15-17-18-19-

OCRESCENT INSULATED WIRE & CABLE CO 319
N Olden ave Trenton 5 NJ (4-15-17-18-19-20-22)—ADV PG 127
Crescent Insulated Wire & Cable Co 319 N Olden Ave Trenton 5 NJ (12-14-15-17-18-19-20-22)
Diamond Wire & Cable Co 445 Park Ave Sycamore II (4-5-6-8-10-14-15-17 thru 23)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza South Long Island City 1 NY (20)
GENERAL CABLE CORP 420 Lexington Ave New York 17 NY (1-2-3-4-5-6-7-8-9-10-11-2-13-14-15-16-17-18-19-20-21-22)—ADV PG 148
General Electric Co Construction Materials Div Wire & Cable Dept 1285 Boston Ave Bridgeport 2 Conn (1-2-3-8-9-15-17 thru 22)
General Insulated Wire Works Inc 69 Gordon Ave

General Insulated Wire Works Inc 69 Gordon Ave Providence 5 RI (8-9-10-11-12-13-14-15-16-

Providence 5 RI (0-7-10-11 17-18-19-20-21-22-23) Hatfield Wire and Cable Div Continental Copper Hatfield Wire and Cable Div Continental Copper Hillside Ave Hillside Ave Hillside & Steel Indus Inc 487 Hillside Ave Hillside 5 NJ (4-7-8-9-10-11-12-13-14-15-16-17-18-19-

5 NJ (4-7-6-7-10-11-12-13-14-13-16-17-16-17-20-21-22-23) Kaiser Aluminum & Chemical Sales Inc 919 Michigan Ave Chicago 11 III (1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-22-23)

7-10-11-12-13-14-15-16-17-18-19-20-22-23)
Lowell Insulated Wire Corp P 0 Box 260 Pawtucket RI (9-15-17-18-19-20-22)
National Electric Products Corp Gateway Center
140 Stanwix St. Pittsburgh 22 Pa (2-3-18-21)

NORMANDY ELECTRIC WIRE CORP 125 Second St.
Brooklyn 31 NY (17)—ADV PG 174

Passaic NJ (2-4-7-17-18-19-20-21) Okonite Co Passaic NJ (2-4-7-17-18-19-20-21)
Packard Electric Div General Motors Corp Warram
Onio (9-10-11-12-13-14-15-16-17-18-19-20-22)
Paranite Wire & Cable Div Essex Wire Cerp
1601 Wall St Fort Wayne 6 Ind (4-7-8-9-1112-13-15-17-18-19-20-21-22)
25 Ecster St Worcester 8

12-13-15-17-18-19-20-21-22)
Phalo Plastics Corp 25 Foster St Worcester 8
Mass (18-20-21-22-218)
PMELPS DDDGE COPPER PRODUCTS CORP 300
Park Ave New York 22 NY (4-17-18-19-2022)—ADV PG 98-99
Plastic Wire & Cable Corp E Main St Jewett City
Conn (17-18-20-21-22-23)
Plastoid Corp 42-61 24th St L 1 C 3 NY (5-20)

Conn (17-18-20-21-22-23)
Plastoid Corp 42-61 24th St L I C 1 NY (5-20)
Radix Wire Co 26260 Lakeland Blvd Cleveland 32
Ohio (1-20)
Rockbestos Products Corp Nicoll and Canner Sts.
New Haven 4 Conn (1-3)
Roebling's (John A) Sons Corp 640 S Broad St
Trenton 2 NJ (7-17)
ROME CABLE CORP Ridge St Rome
17-18-19-20-031-291. ANY 80-326

renton 2 NJ (7-17) NME CABLE CORP Ridge St Rome NY (7-14-17-18-19-20-21-22)—ADV PG 135 oyal Electric Corp 95 Grand Ave Pawtucket RI (1-4-6-8-9-10-11-13 thru 23) Inc 2217-21 N 31 St Mil-

SIMPLEX WIRE & CABLE CO 79 Sidney St Cambridge 39 Mass (2-3-5-7-9-10-12-13-14-16-17-18-19-20-21)—ADV PG 115

18-19-20-21)—ADV FG 1-10
Star-A Electric Mfg Co Inc 269 Meserole St
Brooklyn 6 NY (8-10-15-17-18-22)
Times Wire & Cable Co Wallingford Conn (12-1718-20-21-22)
Victor Electric Wire & Cable Corp 618 Main St
West Warwick RI (20-22-23)

WALKER BROTHERS End St Conshohocken
(17-21)—ADV PG 141
Wasfarn Insulated Wire Co 2425 E 30th St Los Electric Mfg Co Inc 269 (lyn 6 NY (8-10-15-17-18-22)

Wesfern Insulated Wire Co 2425 E 30th St Los Angeles 58 Calif (2-14-15-17-18-21-22) hitney Blake Co 102 Pershing St New Haven 14 Conn (4-9-10-11-17-18-19-20-22)

6D. SPECIFIC APPLICATIONS OF WIRE & CABLE

1. Airport 2. Appliance 3. Burn 4. Brewery

Bridge Control Electric furnace

Gas tube sign

Heater Lamp Magnet

Parkway (Suburban) Railway
Service drop
Service entrance
Signal & communications

20. Stage lighting
21. Submarine
22. Thermostat
23. Welding
24. Water-cooled leads

Accurate Insulated Wire Corp 25 Fox St New Haven 13 Conn (1-2-6-8-11-12-15-19-20)
Acorn Insulated Wire Co 36 Freeman St Pawtucket RI (2-3-4-6-10-11-12-17-18-19-20)
Alphaduct Wire & Cable Co 25 Van Dyke Ave (P 0 80x 709) New Brunswick NJ (19)
American Electric Cable Co 181 Appleton St Holyoke Mass (2-6-9-12-19-20)
American Insulated Wire Corp 36 Freeman St Pawtucket RI (1-2-3-4-6-11-12-15-17-18-19-20)
AMERICAN STEEL & WIRE DIV UNITED STATES STEEL CORP Rockefeller Bidg Cleveland 13 Ohio (1-2-6-7-8-9-10-11-13-14-15-16-17-18-19-20-21)—ADV PG 85-86-87-88
Anaconda Wire & Cable Co 25 Broadway New York 4 NY (1 thru 21)
Ansonia Wire & Cable Co 111 Martin St Ashton RI (1-6-19)
Apex Wire & Cable Corp 237 37th St Brooklyn Apex Wire & Cable Corp 237 37th St Brooklyn 32 NY (2-11-12) 8 & M Electric Corp 168 7th Co. Barth B & M Electric Corp 168 7th St Brooklyn 15 NY (6-11-12-19) (2-9-12-13-14-19-23) Chicago 80 III (2-9-12-13-14-17-23)
Frand (William) & Co Inc 51 North St Willimantic Conn (2-6-19)
Capitol Stage Lighting Co Inc 527 W 45 St New
York 36 NY (20)
Carol Cable Co 190 Middle St Pawtucket RI
(2-6-19) Chester Cable Corp Oakland Ave Chester NY 2-3-6-9-12-19-20)

 OCOLLYER INSULATED WIRE CO 249 Roosevelt
 Ave Pawtucket RI (2 thru 8-10-12-14 thru 20)
 —ADV PG 121
 Control Corp 560 Maryland Ave York Pa ntinental Wire Co (2-6-7-9-15-19) Steel Co Wire and Cable Div Glassport Wire Co Inc 50 Church St N Y 7 NY (2-19-20)

Circle Wire and Cable Corp 5500 Maspeth Ave Maspeth L 1 NY (1-2-3-5-6-8-14-15-17-18-19-

OCRESCENT INSULATED WIRE & CABLE CO 319 N Olden Ave Trenton 5 NJ (12-17)—ADV PG 127 Crescent Insulated Wire & Cable Co 319 N Olden Ave Trenton 5 NJ (4-5-6-7-8-9-10-12-15-16-Ave Trenton 17-18-19-20)

17-18-19-20)
Diamond Wire & Cable Co
445 Park Ave Sycamore
III (2-4-6-7-8-11-12-15-17-18-19-20)
Driver (Wilbur B) Co
1875 McCarter Highway
Newark 4 NJ (7-11)
GENERAL CABLE CORP 420 Lexington Ave New
York 17 NY (1 thru 21)—ADV PG 148
General Electric Co
Construction Materials Div
Wire & Cable Dept 1285 Boston Ave Bridgeport
2 Conn (1-2-6-9-11-13-14-15-18-19-21)
General Insulated Wire Works Inc 6-9 Gordon Ave

2 Conn (1-2-6-9-11-13-14-15-18-19-21)
General Insulated Wire Works Inc. 69 Gordon Ave
Providence 5 RI (2-6-10-11-12-17-18-19)
GRAYBAR ELECTRIC CO INC. 420 Lexington Ave
NY 17 NY (2-6-12-13-17-18)—ADV PG 2-154
Hatfield Wire and Cable Div Continental Copper &
Steel Indus Inc. 487 Hillside Ave Hillside 5 NJ
(1-2-3-4-6-8-9-11-12-14 thru 20)
Hendrix Wire & Cable Corp Milford NH (17)
Hitemp Wires Inc. 1200 Shames Dr Westbury NY
(13-19)

(13-19)
Kaiser Aluminum & Chemical Sales Inc 919 N Michigan Ave Chicago 11 III (1 thru 21)
Kellogg Switchboard and Supply Co 79 W Monroe St Chicago 3 III (19)
Kennecott Wire and Cable Co Phillipsdale (Rumford 16) RI (7-13-16-19)
Lowell Insulated Wire Corp P O Box 260 Pawtucket RI (6-19)

tucket RI (6-19)
Narragansett Wire Co 541 Pawtucket Ave Pawtucket RI (1-3-6-10-15-17-18)
National Electric Products Corp Gateway Center
140 Stanwix St Pittsburgh 22 Pa (2-6-10-11-12-14-17-18-19-21)

12-14-17-18-19-21)

New England Electrical Works Inc 365 Main St

Lisbon NH (9-10-13-19)

NORMANDY ELECTRIC WIRE CORP 125 Second St

Brooklyn 31 NJ (14)—ADV PG 174

Okonite Co Passaic NY (1-5-6-7-8-9-10-12 thru

Paranite Wire & Cable Div Essex Wire Corp Wall St Fort Wayne 6 Ind (2-3-4-6-8 thru 12-15-17-18-19-20) Partrick & Wilkins Co 51 N Seventh St Phila 6 Pa (19-20)

Phalo Plastics Corp 25 Foster St Worcester 8
Mass (1-2-6-8-12-14-15-17-18-19-20)

PHELPS DODGE COPPER PRODUCTS CORP 300
Park Ave New York 22 NY (1-2-3-6-9-10-1315-17-18-19)—ADV PG 98-99
Plastic Wire & Cable Corp E Main St Jewett
City Conn (2-3-6-8-9-15-19-20)
Plastic Word Corp 42-6-1 24th St L I C 1 N Y
(2-6-9-12-19-20)

Parky Wire Co 24-26-0 Lakeland Blad Classics 42-8

(2-6-9-12-19-20)
Radix Wire Co 26260 Lakeland Blvd Cleveland 32
Ohio (2-3-6-7-10-11-12-18-19-20)
Reynolds Metals Co Richmond 18 Va (6-10-17-19)
Rhode Island Insulated Wire Co Inc 50 Burnham
Ave Cranston R I (2-11-12-19)

Ave Cranson R 1 (2-11-12-17)
Rockbestos Products Corp Nicoll and Canner Sts
New Haven 4 Conn (2-6-7-8-19-21)
Roebling's (John A) Sons Corp 640 S Broad St
Trenton 2 NJ (1-6-7-8-10-13-15-16-17-18-19-

21)

ROME CABLE CORP Ridge St Rome
6-8-10-12 thru 20)—ADV PG 135

Royal Electric Corp 95 Grand Ave
R I (2-4-6-9-11-12-19-20)

Pawtucket

(22) Sequoia Wire & Cable Co 2201 Bay Rd (P 0 Box 1007) Redwood City Calif (2-6-19-20)

SIMPLEX WIRE & CABLE CO 79 Sidney St Cambridge 39 Mass (19)—ADV PG 115

Sittler Corp 18 N Ada St Chicago 7 III (10-19)

Smith-Gates Corp Farmington Conn (11)

South River Metal Products Co Inc 377 Turnpike

South River N 1 (10)

Southwire Co Carrollton Ga (3-6-10-17-19)

Star-A Electric Mfg Co Inc 269 Meserole St

Brooklyn 6 N Y (2-11-12-19-20)

Surprenant Mfg Co 199 Washington St Boston B

Mass (2-6-19)

Mass (2-6-19) mosolite Insulated Wire Co I Tarrytown NY (2-6-13-19) mes Wire & Cable Co Walli

Tarrytown NY (2-6-13-19)
Times Wire & Cable Co Wallingford Conn (2-12)
TRIANGLE CONDUIT & CABLE CO INC Triangle &
Jersey Aves New Brunswick NJ (1-2-6-15-1718)—ADV PG 113
Victor Electric Wire & Cable Corp 618 Main St
West Warwick R I (2-6-12-19)
WMALKER BROTHERS End St Conshohocken Pa (36-17-18-19)—ADV PG 141
Watteredge Co 19629 West Lake Rd Rocky River
16 0hio (24)

Watteredge Co 16 Ohio (24)

16 Ohio (24)
Western Insulated Wire Co 2425 E 30th St. Los
Angeles 58 Calif (2-46-8-10-13-15-17-18-20)
WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1 thru 21)—ADV PG 2nd Cover 102 Pershing St New Haven 14

Whitney Blake Co 1 Conn (6-10-16-19)

6E. PORTABLE CORD SETS

Includes sets with appropriate connecting bodies at both ends. For cords with lamps attached, see "Trouble Lamps" in index. For cord without connectors, see "Cord."

Accurate Insulated Wire Corp 25 Fox St New Haven 13 Com (1-2-3-4) Accorn Insulated Wire Co 36 Freeman St Paw-tucket RI (1-3)

tucket RI (1-3)
American Electric Cable Co 181 Appleton St Holyoke Mass (1)

MMERICAN STEEL & WIRE DIV UNITED STATES
STEEL CORP Rockefeller Bldg Cleveland 13
Ohio (1)—ADV PC 85-86-67-88
Anaconda Wire & Cable Co 25 Broadway New Ohio tarvine & Cable Co 29 brown Vork 4 NV (1-3)

Apex Wire & Cable Corp 237 37th St Brooklyn 22 Apex Wire & Cable Lorp
NY (1-2)
Appleton Electric Co 1701-59 Wellington Ave
Chicago 13 III (1)
Associated Engineering Corp 65 Kent St Brookline
46 Mass (1-2)
B & M Electric Corp 168 7th St Brooklyn 15 NY
(1-2) (1-2)
Beckley Electric Co Inc 468-470 Grand Ave Brook-lyn 38 NY (1-2)
Belden Mfg Co P 0 Box 5070A Chicago 80 III Electric Co 1844-50 W 21 St Chicago 8 III

Reel Products Inc 10700 Broadway Cleveland 25 Ohio (4) lack (M) Mfg Co 300-08 N Third St Phila 6

Pa (1)
Capitol Stage Lighting Co Inc 527 W 45 St New
York 36 Ny (1)
Carol Cable Co 190 Middle St Pawtucket RI (1)
CIRCLE F MFG CO 720 Monmouth St Trenton 4
NJ (1)—ADV PG 112
Cordomatic Div Vacuum Cleaner Corp of America
1724 W Indiana Ave Phila 32 Pa (4)
Cornish Wire Co Inc 50 Church St N Y 7 NY
(1-3)

(1-3) Crescent Co Inc 20 Central Ave Pawtucket RI (1-2)

(1-2)
Diamond Wire & Cable Co 445 Park Ave Sycamore
III (1-2-3-4)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza
South Long Island City 1 NY (1-2-3)
Electri-Cord Mfg Co Inc 2554-2568 E 18th St
Brooklyn 35 NY (1)
Ericson Mfg Co 1660 Hayden Ave Cleveland 12
Ohio (1-2)

Brooklyn 35 NY (1)
Ericson Mfg Co 1660 Hayden Ave Cleveland 12
Ohio (1-2)
Gem Electric Mfg Co Inc 237 37th St Brooklyn
NY (1) Cable Corp 420 Lexington Ave NY 17 NY

(1-2-3-4)Electric Co Construction Materials Div Device Dept 95 Hathaway St Providence

General Insulated Wire Works Inc 69 Gordon Ave Providence 5 RI (1-2-4) Hatfield Wire and Cable Div Continental Copper & Steel Indus Inc 487 Hillside Ave Hillside 5 NJ

(2)
Kaiser Aluminum & Chemical Sales Inc 919 N Michigan Ave Chicago 11 III (1 thru 4)
Koiled Kords Inc Box K Hamden Conn (4)
Leviton Mfg Co Inc 236 Greenpoint Ave Brooklyn

Lowell Insolated Wire Corp P 0 Box 260 Pawtucket RI (1)

MIDWEST ELECTRIC PRODUCTS INC 1515 N Front St Mankato Minn (3)—ADV P6 172

Murray (0 A) Co Inc 632 N Mill St Tipton Ind

(1-2)
Okonite Co Passalc NJ (1-2)
Okonite Co Passalc NJ (1-2)
Paranite Wire & Cable Div Essex Wire Corp 1601
Wall St Fort Wayne 6 Ind (3)
Phalo Plastics Corp 25 Foster St Worcester 8
Mass (1-2-3)
PHELPS DODGE COPPER PRODUCTS CORP 300
Park Ave New York 22 NY (1)—ADV PG 98-99
Plastic Wire & Cable Corp E Main St Jewett City
Conn (1-2-3-4)
Rhode Island Insulated Wire Co Inc 50 Burnham
Ave Cranston RI (1)
Riverside Mfg & Electrical Supply Co 10228
Michigan Ave Dearborn Mich (2)
Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa (1-3)

(1-3)
Rome Cable Corp Ridge St Rome NY (1-3)
Royal Electric Corp 95 Grand Ave Pawtucket RI Seeger-Williams Inc 4 Norman St Bridgeport 5 Conn (2) Sperti Faraday Inc 1322 E Church St Adrian Mich

(1-2)
Standard Portable Cord Co Inc Mayville NY (1)
Star-A Electric Mfg Co Inc 269 Meserole St
Brooklyn 6 NY (1-3)
Victor Electric Wire & Cable Corp 618 Main St
West Warwick RI (2)
Wilkoff (M J) Co 823 Locust Pittsburgh 19 Pa

6F. CONNECTING & TERMINATING DEVICES

Connectors—pressure
Connectors—solderless
End seals
Lugs & terminals
Potheads & terminators
Splices, kits & equipment
Terminal blocks & binding posts
Wire nuts

8. Wire nuts
9. Collecting rings & shoes
10. Ground clamps

Accessories used for splicing, terminating, or connecting wire and cable to equipment or fittings.

AMP Inc Eisenhower Blvd Harrisburg Pa (2-4-6) Adalet Mfg Co 14300 Lorain Ave Cleveland 11 Ohio (3-5)

Allen-Bradley Co 136 W Greenfield Ave Milwaukee 4 Wis (7) ed Industries Inc P O Box 119 Ogallala Neb (3)

(3)
Anaconda Wire & Cable Co 25 Broadway New
York 4 N Y (5-6)
Anderson Electric Corp P 0 Drawer 2151 Birmingham 1 Ala (1-4-6)
Anthony (F M) Co 773 University Ave Berkeley 10
Calif (1-2-4-6) (Jasper) Corp 1525 Woodson Rd St 4 Mo (2-4-6) Blackburn (Jasper) Corp 1525 Woodson Rd St Louis 14 Mo (2-4-6) Blaco Mfg Co 6541 Euclid Ave Cleveland 3 Ohio

(9) BUCHANAN ELECTRICAL PRODUCTS CORP
 U S Route 22 Hillside NJ (1-2-4-6-7)—
 PG 110

PG 110

Burndy Corp Norwalk Conn (1-2-4-6-7)—ADV
PG 110

Burndy Corp Norwalk Conn (1-2-4-6-7)—ADV
PG 200

Cam-Lok Div Empire Products Inc 9201 Blue Ash
Rd (Box 98) Cincinnati 36 Ohio (1-2-4-6)

Central Percelain Co 507 Railroad St Columbiana
Ohio (2-8)

Curtis Development & Mfg Co 3244 N 33 St
Milwaukee 16 Wis (7)

Dante Electric Mfg Co Bantam Conn (2-8)

Delta-Star Electric Div H K Porter Co Inc 2437

Fulton St Chicago 12 111 (2-3-4-5)

DOSSERT MFG CORP 249-255 Huron St Brooklyn
22 NY (1-2-4-6)—ADV PG 167

Earl (H W) & Co 6225 S W 8th St Miama 44
Fia (2)

Eastern Specialty Co 3617 N 845 Fa 7000

Eastern Specialty Co 3617 N 8th St Phila 40 Pa (7)

Pa (7)

Electric Terminals & Connectors Inc 990 E 67 St Cleveland 3 Ohio (1-2-4)

Elliott Electric Products Co 1513 Olmstead Ave New York 62 N Y (1-2-3-4-6-8)

ERICO PRODUCTS INC 2070 E 61 Pl Cleveland 3 Ohio (2-4)—ADV PG 129

Esco Mfg Co P 0 Box 1039 Greenville Texas (5)

Fargo Mfg Co Inc 845 Main St Poughkeepsle N Y (1-2-.)

Frankel Connector Ca 27 Victor Con Frankel Connector Co 27 Vestry St N Y 13 N Y (2-4) N Y (2-4)

6 & W Electric Specialty Co 3500 W 127 St Blue
Island III (3-5-6)

General Electric Co
Wiring Device Dept

RI (1-4)

William Sevice Dept

95 Hathaway St Providence
RI (1-4)

Hollingsworth Co Solderless Terminal Div Box 430 Phoenixville Pa (2-4)

●IDEAL INDUSTRIES INC 5136 Park Ave Sycamore
III (8)—ADV PG 124 sco Corp 4730 Madison Rd Cincinnati 27 Ohio (1-2-7)

(1-2-7)
Joslyn Mfg & Supply Co 3700 S Morgan St Chicago 9 111 (1-2-6)
Joy Mfg Co Electrical Products Div 1201 Macklind Ave St Louis 10 Mo (1-3-5-7)
Kellogg Switchboard and Supply Co 79 W Monroe
St Chicago 3 111 (4-6-7)
Kolton Electric Mfg Co 123 New Jersey Railroad
Ave Newark 5 NJ (2-4-7)
Krueger & Hudepohl Inc 1041 Evans St Cincinnati
4 Ohio (1-2-4-6)

vernon NY (1-2-4-7)
Line Material Industries McGraw-Edison Co 700 W
Michigan St Milwaukee Wis (2-6)

LINT (CLYDE W) 2323 W 18 St Chicago 8 III
(2-6)—ADV PG 170

(2-6)—ADV PG 170

M & W ELECTRIC MFG CO INC S Walnut St (P O Box 87) East Palestine Ohio (10)—ADV PG 165

MADISON EQUIPMENT CO 5405 Detroit Ave Cleveland 2 Ohio (8)—ADV PG 167

Marshall (John) Associates Inc Box 2463 Bridgeport 8 Conn (2-7)

Marshall (Jonn) Associates and Associates for the port 8 Conn (2-7)
Mend-It Sleeve Mfg Co 3125 Gloria Terrace Lafayette Calif (1-2)
Metalectrics Inc 677 Broadway NY 12 NY (1-2-8)
Midwest Electric Mfg Co 1639 Walnut St Chicago Millowest Electric Ming to 1627 Values of Products
12 III (12-4)
Minnesota Mining and Mfg Co Electrical Products
Div 900 Bush Ave St Paul 6
Minn (1-2-6-8)
National Electric Products Corp
140 Stamwix St Pittsburgh 22 Pa (1-2-4-7)
262 Bond St

O Z ELECTRICAL MFG CO INC 262 Bond St Brooklyn 17 NY (1-2-4)—ADV PG 126 Ohio Brass Co 380 N Main St Mansfield Chio

Okonite Co Passaic NJ (6)

PLM PRODUCTS INC 3871 W 150 St Cleveland
11 Ohio (5-6)—ADV PG 171
Pekcu Co 1227 McDonald Ave Brooklyn 30 NY
(1-2-6)
Para Nalon Stackie Comp. 315 State St. Evia Pa Penn-Union Electric Corp 315 State St Erle Pa (1-2-4-6-7) (1-2-4-6-7)
Preformed Line Products Co 5349 St Clair Ave Cleveland 3 Ohio (6)
Rattan Mfg Co 10 Wall St (P O Box 1745) New Haven 7 Conn (1-2)
Red Seal Electric Co 10307 Detroit Ave Cleveland 2 Ohio (3)

Ohio (3) Richard Mfg Co Ltd 25 Rankin St Newark 3 NJ (1-2-4-6)

Rusgreen Mfg Co 14262 Birwood Ave Detroit 38 Mich (2-4-5-6) (H B) Mfg Co 22 Barney Battle Creek

Mich (1-2-4) Southern Electrical Equipment Co 308 W Bland at Mint St Charlotte 3 NC (2) Standard Electric Time Co 89 Logan St Springfield Star-A Electric Mfg Co Inc 269 Meserole St Brooklyn 6 NY (8) States Co 19 New Park Ave Hartford 6 Conn (7) Superior Electric Co 83 Laurel St Bristol Conn (7) Surprenant Mfg Co 199 Washington St Boston 8
Mass (3) nomas & Betts Co 36 Butler St Elizabeth 1 NJ (1-2-4-6-8) Vaco Products Co 317 E Ontario St Chicago 11

Wama Co Industrial Bldg Baltimore 2 Md (7)
Wateredge Co 19629 West Lake Rd Rocky River 16 Ohio (4)

WEAVER (J A) CO 2110 Howard St St Louis 6
Mo (2)—ADV PG 171
Yorkville Metal Products Co 677 Broadway N Y 12 NY (2-8)

6G. CONDUCTOR SUPPORTS

Bushings
 Cleats, knobs & tubes
 Hangers & grips
 Racks & framing
 Staples, clamps & clips
 Trays
 Troughs
 Drive & bridle rings

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Accessories for holding wire and cable in place from source to load. See also "Raceways".

Adalet Mfg Co 14300 Lorain Ave Cleveland 11 Ohio (1) Onio (1)
American Steel & Iron Works 5801 S Lowe Ave
Chicago 21 III (4)
Anderson Electric Corp P 0 Drawer 2151 Birmingham 1 Ala (5)
Atlas Tack Corp Pleasant & South Sts Fairhaven

BUCHANAN ELECTRICAL PRODUCTS CORP 237 U S Route 22 Hillside NJ (5)—ADV PG 110 Capson Mfg Co 2565 W Fullerton Ave Chicago 47 Capson M Central Porcelain Co 507 Railroad St Columbiana Ohio (2) Chalfant Products Co Inc 11525 Madison Ave

Chalfart Products Co Inc 11525 Madison Ave Cleveland 2 Ohio (4-6-7) COPE (T J) DIV ROME CABLE CORP Collegeville 5 Pa (4-7)—ADV PG 116 5 Pa (4-7)—ADV PG 116
Couch (S H) Co Inc 3 Arlington St North Quincy
71 Mass (5)
Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III (2-3-6-7)
Efficiency Electric & Mfg Co Park Ave Ext P O
Box 30 East Palestine Ohio (1-2-4)
Eliza Metal Products Co Box 408 Bridgeville
Pa (77)
Elizat Electric Products Co 3-333 Olimstand Ave

Pa (7)
Elliott Electric Products Co 1513 Olmstead Ave New York 62 N Y (1)
Fasform Div Heller Roberts Mfg Corp 3610
Superior Ave Cleveland 14 Ohio (8)

FULLMAN MFG CO 1209-1215 Jefferson St Latrobe Pa (5)—ADV PG 120
General Metals Inc 858 Goldsbro Greensboro NC (7)
Handy Apole Div Levekii Commonwealth

(7)
Handy Angle Div Lug-All Co 355 Lancaster Ave Haverford Pa (4) Handy Angle Div Lug-All Co 355 Lancaster Ave Haverford Pa (4) Housky PRODUCTS INC 5300 Vine St Cincinnati 17 Ohio (3 thru 7)—ADV PG 132
JOHNS-MANVILLE 22 E 40 St New York 16 NY (6)—ADV PG 171
Kellems Co Inc 15 Williams St Stonington Conn (3)

Kellems Co Inc. 15 Williams St. Stonington Conn (3)

Kellogs Switchboard and Supply Co. 79 W Monroe St. Chicago 3 III (2)

Knox Porcelain Corp. 2706 Mynders Ave. (P. 0. Box. 2031). Knoxville 1 Tenn (2).

Leibfried (C. H.) Mfg. Corp. 95-101 Guernsey St. Brooklyn 22. NY (3-4).

Line Material Industries McGraw-Edison Co. 700. W Michigan St. Milwaukee Wis. (4).

LINT (CLYDE). 2323 W 18 St. Chicago 8 III (2).

ADV. PG. 170.

M. & T. Welding. Products. Corp. 703. 37th. Ave. 0.00 Alland. Calif. (4).

M. & W. Electric Mfg. Co. Inc. S. Walnut. St. (P. 0. Box. 97). East. Palestine. Ohio. (4).

MADISON. EQUIPMENT. CO. 5405. Detroit. Ave. Cleveland. 2. Ohio. (5).—ADV. PG. 167.

Metalectrics. Inc. 677 Broadway. N. Y. 12. N. Y. (1).

Midwest Electric. Mfg. Co. 16-39 Walnut. St. Chicago. 12. III (3-5).

Midwest Electric Mfg Co 1639 Walnut St Chicago 12 III (3-5)

MINBERALLAC ELECTRIC CO 25 N Peoria St Chicago 7 III (1)—ADV PG 175-177

National Electric Products Corp Gateway Center 140 Stanwix St Pittsburgh 22 Pa (1)

O Z ELECTRICAL MFG CO INC 262 Bond St Brooklyn 17 NV (1)—ADV PG 126

PW Industries Inc Duncan & Melrose Sts Phila 24 Pa (4-7)

Palmer Flectric & Mfg Co 24 Water St Wakefeld ectric & Mfg Co 24 Water St Wakefield Mass (7)

Products Inc 224 N Patterson St Carey receian Frounds.
Ohio (2)
Ohio (2)
Id Seal Electric Co 10307 Detroit Avé Cleveland 2 Ohio (1)
And Ath & Minor Sts Emmaus

Pa (2) Rusgreen Mfg Co 14262 Birwood Ave Detroit 38 Mich (5) Russell & Stoll Co Inc 125 Barclay St N Y 7 N Y (1) Mfg Co 14262 Birwood Ave Detroit 38

liams Inc 4 Norman St Bridgeport 5 Conn (5)

Steel City Electric Co 1207 Columbus Ave Pitts-burgh 33 Pc 4(1-2-3-4-5) Superior Porclaim Co Superior Staple Mfg Co 40 Commercial St Fitch-burg Mass (5) TA Mfg Corp 4607 Alger St Los Angeles 39 Calif (1)

THIEL TOOL & ENGINEERING CO 1417 N Market
St St Louis 6 Mo (5)—ADV PG 162
Titchener (E H) & Co 67 Clinton St Binghamton
N Y (5) Unistrut Products Co 933 Washington Blvd Chl-

cago 7 III (4)

•WADSWORTH ELECTRIC MFG CO INC 20-34 W
11th St (Box 272) Covington Ky (7)—ADV PG 11th St 166-170 Washington Aluminum Co Inc Knecht Ave & Penn-sylvania RR Baltimore 29 Md (4-7)

6H. BUSBAR & SUPPORTS

For switchboards, substations and similar applications. For enclosed busbar see "Bus-

Aluminum Co of America 1501 Alcoa Bldg Pitts-Pa Anderson Electric Corp P 0 Drawer 2151 Birming-ham 1 Ala Burndy Corp Norwalk Conn Dossert Mfg Corp 249-255 Huron St Brooklyn

22 N Y 22 N Y
Electric Materials Co Box 390 North East Pa
ERICO PRODUCTS INC 2070 E 61 P1 Cleveland 3
Ohio—ADV PG 129
General Electric Co Apparatus Sales Div Schenec-

tady 5 NY emco Engineering & Mfg Co Inc Commack L I

Memco Engineering & Mrtg to Into Comminue & . N Y

O Z ELECTRICAL MFG CO INC 262 Bond St
Brooklyn 17 NY—ADV PG 126

Penn-Union Electric Corp 315 State St Erie Pa

POWERCRAFT CORP 2215 De Kalb St St Louis 4

Mo—ADV PG 164

Red Seal Electric Co 10307 Detroit Ave Cleve-land 2 Ohio Revere Copper & Brass Inc 230 Park Ave NY 17

Rusgreen Mfg Co 14262 Birwood Ave Detroit 38 Southern Electrical Equipment Co 308 W Bland at Mint St Charlotte 3 NC

Mint St Charlotte 3 NC Young Electric & Mfg Co Inc 2134 Curtis Denver

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

Description, Pages Catalog No. & Mfr. *Code No.

6-1 Telephone Wire & Cable; 22p; Cat. No. T4 (Whitney Blake)

6-2 Flexible Cord; 24p; Cat. No. FC-52 (Whitney

Shielded Wire & Cable; 8p; Cat. No. SW-1 (Whitney Blake)

Connectors & Fittings 32p; Cat. No. 57 (Metalectrics)

Pressure Connectors, Lugs & Clips; 34p; Cat. No. 50-J (Ilsco)

Electrical Fittings for Wire & Cable; 27p

Cable Supporting Systems; 100p; Cat. No. 1257 (Cope) 6-7

6-8 Oval Connectors; 64p; Cat. No. CA-5a (Joy) 6-9 Round Connectors; 64p; Cat. No. CA-5b (Joy)

Electrical Wires & Cables; 50p; (Western In-6-10

Terminals & Connectors; 12p; Cat. No. S7 (Thomas & Betts) 6-11

Cable Ladder & Accessories; 12p; Cat. No. 156-E (P-W) 6-12

6-13 Cabletrof and Accessories; 12p; Cat. No. 256-F (P-W)

Tubing Supports & Accessories; 20p; Cat. No. 656-G (P-W)

6-15 Wire & Cable; 26p (Ettco)

Interlocked Armor Cable System; 34p; Cat. No. 19-606 (G-E)

6-17 Aerial Cable; 13p; Cat. No. 19-266 (G-E) 6-18 Power Cable; 17p; Cat. No. 19-405 (G-E)

6-19 Wire & Cable 100p (Crescent)

6-20 Insulated Wires & Cables; 16p; Cat. No. 150

Portable Power Cables; 128p; Cat. No. 152 6-21

Municipal Signal & Lighting Cables; 20p; Cat. No. 254 (Collyer) 6-22

Varnished Cambric Insulated Wires & Cables; 16p; Cat. No. VC-45 (Collyer)

Solderless Connectors; 18p; Cat. No. 4S (Frankel) 6-24

Heavy Duty & Grounding Connectors; 48p; Cat. No. 4C (Frankel) 6-25

Aluminum Overhead Conductors, Building Wires and Service Drop Cables; 50p (Gen-eral Cable)

Power, Lighting & Control Cables; 166p (General Cable) 6-27

Heavy Duty Portable Cords & Cables; 56p (General Cable)

Paper Insulated Power Cables; 64p (General Cable)

Disconnecting Potheads; 76p; Cat. No. AB-51 6-30

Splicing Kits for Power Cables; 28p; Cat. No. JA-56 (G&W) 6-31

Wire-Weight Slide Rule Computer (Hatfield) 6-32 Indoor Bus S (Delta-Star) Supports; 40p; Cat. No. 31C

Cableways for Control & Power Cables; 20p; Cat. No. 68 (Delta-Star) 6-34

6-35 Outdoor Bus Supports; 32p; Cat. No. 34B

Terminal Lug Power Connectors; 15p; Cat. No. 38E-10 (Delta-Star) 6-36

Stud Power Connectors; 19p; Cat. No. 38E-9 6-37 (Delta-Star)

Square Tubing Power Connectors; 19p; Cat. No. 38E-6 (Delta-Star)

Wire & Cable; 80p; Cat. No. 10G (Rock-bestos)

AVA Manual; 28p; Cat. No. RM-16-57 (Rockbestos)

6-41 Cable Supporting System; 118p (Husky)

Connectors, Plugs & Receptacles; 62p; Cat. No. 1251-I (Pyle-National) 6-43 Cable Grips; 32p; Cat. No. 51 (Kellems)

Terminating & Splicing Accessories; 51p; Cat. No. 301 (PLM) 6-44

Service Entrance Cable; 8p; Cat. No. EC-726

Laytex-Resin Control Cables: 16p; Cat. No. 6-46 EC-719 (Kaiser)

wer & Lighting Cable; 16p; Cat. No. EC-716 (Kaiser) 6-47

Aluminum Conductors on the Farm; 12p; Cat. No. EC-717 (Kaiser)

Aluminum Cable Engineering Memos; 24p; Cat. No. EC-717 (Kaiser)

Splicing & Terminating Cables; 36p; Cat. No. W-56-4 (Kaiser) 6-50

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the Electrical Products Guide" when ordering. Prices are subject to change.

Rome Cable Corp., Ridge St., Rome, N. Y.: Cable Manual of Technical Information, 400p. Cable Installation Practices, 20p. Price: \$1.00

American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.: ASTM Standards on Copper and Copper Alloys, 674p. Price: 55.75 ASTM Standards on Metallic Electrical Conductors, 334p. Price: \$3.75 Symposium on Corona, 32p. Price: \$1.25

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price: \$1.50

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

SECTION 7. **RACEWAY AND FITTINGS**

Raceway tools are listed in Section 12. Trays and troughs and other conductor supports are listed in Section 6.

7A. AUXILIARY GUTTERS

For increasing size of cabinets and panels to provide additional wiring room

Adam (Frank) Electric Co 3647 Windsor PI St Alwalt Mfg Co 1706 Lapham Dr Modesto Calif Burns (James F) Co 705-715 Cherry St Philadel-

Alwait Mrg Co 1706 Lapham Dr Modesto Calif Burns (James F) Co 705-715 Cherry St Philadelphia 6 Pa Delta-Star Electric Div H K Porter Co Inc 2437 Fulton St Chicago 12 III General Metals Inc 858 Goldsboro Greensboro NC Hoffman Engineering Corp 1050 Tyler St Anoka Minn Co 23338 Showard Ref. Warren

Keystone Mfg Co 23328 Sherwood Rd Warren Mich

Mich National Electric Products Corp Gateway Center 140 Stanwix St Pittsburgh 22 Pa Parker Electrical Mfg Co 221 Washington St Oakland 7 Calif

land 7 Calif Queen Products Co Inc Thirteenth & Rowan Sts Louisville 3 Ky Square D Co 6060 Rivard St Detroit 11 Mich Sun Electric Products Inc 28 S Day St Orange

Wadsworth Electric Mfg Co Inc 20-34 W 11th St

(Box 272) Covington Ky

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa—ADV PG 2nd Cover
Young Electric & Mfg Co Inc 2134 Curtis Denver 2

CCO Electrical Products 729 Turner Los Angeles 2 Calif

7B. BUSWAY

- 1. Low-impedance feeder
- 2. Plug-in
 3. Current-Ilmiting

Metal-enclosed busbars for exposed wiring

Adam (Frank) Electric Co 3647 Windsor PI St Louis Mo (1-2) BullDog Electric Products Co 7610 Jeseph Campau Detroit Mich (1-2) CALVERT CO 19851 Ingersoll Dr Rocky River 16 Ohio (1)—ADV PG 165 CONTINENTAL ELECTRIC EQUIPMENT CO Box 1055 Cincinnati 1 Ohio (1.2)—ADV PG 3rd

Electric Distribution Products Inc Allentown Pa (2)

Federal Pacific Electric Co 50 Paris St Newark 5 N.I (2-3)

RJ 16-37 General Electric Co Industrial Power Components DIV Distribution Assemblies Dept 41 Woodford Ave Plainville Com (12-23) •INSUL-8-CORP 1369 Industrial Rd San Carlos Calif (1-22)—ADV PG 176

Callif (1-2)—ADV PG 176
National Electric Products Corp Gateway Center
140 Stanwix St Pittsburgh 22 Pa (1-2)
Nelson Electric Mfg Co P 0 Box 5385 Tulsa Okla
Square D Co 6060 Rivard St Detroit 11 Mich (1-2-3)

(1-2-3)
Westinghouse Electric Corp P 0 Box 868 Pitts-burgh 30 Pa (1-2-3)

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway Center Pittsburgh 30 Pa (1-2-3)—ADV PG

Young Electric & Mfg Co Inc 2134 Curtis Denver 2 Colo (1) Zinsco Electrical Products 729 Turner Los Angeles 12 Calif (1-2)

7C. CELLULAR FLOOR RACEWAY SYSTEMS

- Metallic
 Non-metallic
 Concrete

Systems which permit use of structural ma-terials for enclosing electrical conductors.

Ceco Steel Products Corp 5601 W 26 St Chicago 50 III (1) Conduffor Corp 3338G Warren Rd Cleveland 11 Ohio (3)

General Electric Co Construction Materials Div Conduit Products Dept 1285 Boston Ave Bridge-port 2 Conn (1-2) Howard Electric Co 1950 Ruby St Meirose Park

National Electric Products Corp Gateway Center 140 Stanwix St Pittsburgh 22 Pa (1) Walker Brothers End St Conshohocken Pa (1)

7D. CONDUIT & DUCT

- 1. Aluminum
 2. Asbestos-cement
 3. Clay
 4. Fibur
 5. Steel
 6. Steel, plastic-coated
 7. Wrought iron
 8. Soapstone
 9. Plastic
 10. Alloy

For protection of conductors between source and load. For accessories, see "Conduit Fittings".

Aluminum Co of America 1501 Alcoa Bldg Pitts-burgh 19 Pa (1) American Metal Moulding Co 146 Colt St Irvington

N.I (6) Brown Co 150 Causeway St Boston Mass (4)
CLIFTON CONDUIT CORP 3300 Eastbourne Ave
Baltimore 24 Md (5)—ADV PG 107
General Electric Co Construction Materials Div
Conduit Products Dept 1285 Boston Ave Bridge-

General Electric Co Construction Materials Div
Conduit Products Dept 1285 Boston Ave Bridgeport 2 Con (5-6)
GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (5)—ADV PG 2-154

JOHNS-MANVILLE 22 E 40 St New York 16
NY (2)—ADV PG 171
Kyova Fibre Pipe Co Ironton Ohlo (4)
Laclede Steel Co Arcade Bldg St Louis 1 Mo (5)
Line Material Industries Micuraw-Edison Co 700
W Michigan St Milwaukee Wis (4)
Mark (Clayton) & Co 1900 Dempster St Evanston
III (5)
Natco Corp 327 Fifth Ave Pittburgh 22 Pa (3)
National Electric Products Corp Gateway Center
140 Stamwix St Pittburgh 22 Pa (5)
Prittsburgh Mg Co Inc Orangeburg NY (4)
Pittsburgh 22 Pa (1-5)
Pittsburgh 23 Pa (1-5)
Pittsburgh 23 Pa (5)
Republic Steel Corp Steel And Tubes Div 224 E
131 St Cleveland 8 Ohle (5-6)
Reynolds Metals Co 3085 Beach St Qakland Calif
ROME CRAILE CORP Ridge St Rome NY (5)—
ADV PG 135
Saanstone Duct Co 3085 Beach St Qakland Calif

ADV PG 135 tone Duct Co 3985 Beach St Oakland Calif

(8)
Spang-Chalfant Div National Supply Co Two Gateway Center (P O Box 416) Pittsburgh 30 Pa
STEELDUCT CO Republic Steel Bldg Youngstown
Ohio (5)—ADV PG 143
TRIANGLE CONDUIT & CABLE CO INC Triangle &
Jersey Aves New Brunswick NJ (5)—ADV PG
113

OUNITED STATES RUBBER CO NAUGATUCK CHEM-ICAL DIV 946K Elm St Naugatuck Conn— ADV PG 145

 WALKER BROTHERS End St Conshohocken Pa MALKER BRUINERS
 (5)—ADV PG 141
 WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
 Plitsburgh 30 Pa (5)—ADV PG 2nd

SYOUNGSTOWN SHEET AND TUBE CO Stambaugh
 Bidg Youngstown 1 Ohio (5-10)—ADV PG 161

7E. CONDUIT FITTINGS

- Connectors
 Bushings, couplings & locknuts
 Bushing adapters
 Conduit bodies & covers
 Blows & goesenecks
 Folgonors

- 6. Enlargers 7. Expansion fittings 8. Gaskets
- Hangers, straps, clamps & supports Markers

- 10. Markers
 11. Nipples & running thread
 12. Seals, sealing plugs & compound
 13. Service entrance masts, heads & fittings
 14. Thread guards

Accessories used to join, seal or terminate conduit and electric metallic tubing. See also "Boxes".

Acme Mfg & Gasket Co 738 N 41 St Phila 4 Pa

◆ADALET MFG CO 14300 Lorain Ave Cleveland 11 Ohio (2-7-12-13)—ADV PG 168

Ohio (2-7-12-13)—ADV PG 168
Allen-Stevens Conduit Fittings Corp 33-53 62nd St
Woodside 77 NY (1-2-3-7-13)
Apex BQIt Products Co 452-458 No Claremont Ave
Chicago 12 III (9)
Appleton Electric Co 1701-59 Wellington Ave
Chicago 13 III (1-2-3-4-9-11-12-13)

Arrolet Corp Foot of Bower St Montgomery Pa (2-3-4-8)

(2-3-4-8)
Associated Manufacturers & Distributors Corp 5015
S E Haig St Portland 6 Ore (1-11)
Badger Die Casting Corp 201 W Oklahoma Ave
Milwaukee 7 Wis (1)
Blackhawk Industries 250 S Main St Dubuque
Iowa (1-2-3-4-9-12-13)

Iowa (1-2-3-4-9-12-13)
Bowers Mfg Co Inc 6700 Avalon Blvd Los Angeles
3 Calif (9)
Brady (W H) Co 727 W Glendale Ave Milwaukee
9 Wis .10)

BRICGEL METHOD TOOL CO 104 N E First St
Galva III (11—ADV PG 106
Brown Company 150 Causeway St Boston 14 Mass
(1-5-6)

(1-5-6)
BUCHAMAN ELECTRICAL PRODUCTS CORP 237
U S Route 22 Hillside NJ (2)—ADV PG 110
Burndy Corp Norwalk Conn (1-7)
Clifton Conduit Corp 3300 Eastbourne Ave Baltimore 24 Md (2-5-11)

Clifton Conduit Corp 3300 Eastbourne Ave Baltimore 24 Md (2-5-11)
Conduit Fittings Corp 6400 W 66th St Chicago 38
III (1-2-5-9-11-13)
Conduit Nipple Mfg Co 1455 Spring Garden Ave
Pittsburgh 12 Pa (2-5-11)
CONDUIT PIPE PRODUCTS CO 157 W Fulton St
Columbus 16 Ohio (2-5-11)—ADV PG 114
CROUSE-HINDS CO Syracuse 1 NY (1 thru 9-1213)—ADV PG 96-97
Diampool Expansion Bolt Co Inc. Garwood NJ (9)

DERCUISE-HINDS CO Syracuse 1 NY (1 thru 9-12-13)—ADV PG 96-97
Diamond Expansion Bolt Co Inc Garwood NJ (9)
Duro Fittings Co 2210 S Davie Ave Los Angeles
22 Calif (1-2-3-4-9-11-12)*
Earl Electric Mfg Corp 35-20 Borden Ave Long
Island City NY (1-2-9)
Efficiency Electric & Mfg Co Park Ave Ext P 0
Box 30 East Palestine Ohio (9)
ELECTRIC TUBE PRODUCTS 74-16 Grand Ave
Maspeth NY (1-2-11)—ADV PG 169
Electrical Fittings Corp 37-50 57th St Woodside
77 NY (1-2-4-5-8-9-11-12-13)*
Electroline Mfg Co 2622 E 51st St Cleveland 4
Ohio (1-2-3)*
Elliott Electric Products Co 1513 Olimstead Ave
New York 62 NY (1 thru 14)
Fast-Lok Mfg Co Ash St at Bedford Bridgeport 5
Conn (4-9)
FULLMAN MFG CO 1209-1215 Jefferson St
Latrobe Mfg Co (1 Americas Bldg Radio City
N Y 20 NY (1 Hyru 6-8-0-11-12-11-11-12)

Latrobe Pa (9)—ADV PG 120
Gedney Electric Co Americas Bldg Radio City
N Y 20 NY (1 thru 6-8-9-11-12-13-14)
General Steel Fittings Co 1321 21st St Racine
Wis (2-1)
GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (1 thru 14)—ADV PG 2
Grinnell Co Inc 260 W Exchange St Prøvidence 2
RI (9)

Halex Die Casting Co 8640 Bessemer Cleveland 27 Ohio (1-2) Holub Industries Inc 442 Elm St Sycamore III

(9)
DEAL-SIMPLET FITTINGS INC 5136 Pa Sycamore III (1-4-5-8-9)—ADV PG 156 Kaiser Aluminum & Chemical Sales Inc Michigan Ave Chicago 11 III (2-5) Kees (F D) Mfg Co 700 Park Ave Beatric Park Ave Inc 919 N

Keystone Mfg Co 23328 Sherwood Rd Warren (9) •KILLARK ELECTRIC MFG CO 3940 Easton Ave St Louis 13 Mo (1-2 thru 6-8-12-13)—ADV PG

St L 109 Kondu Corp 1040 W 12 St Erie Pa (1-2-4-5-11-

13)

Korns (C C) Co P O Box 483 Jennstewn Pa (9)

Leibfried (C H) Mfg Corp 95-101 Guernsey St

Brooklyn 22 NY (9)

Line Material Industries McGraw-Edison Co 700

W Michigan St Milwaukee Wis (5-11-12)

LINT (CLVDE W) 2232 W 18 St Chicago 8 III

(9-13)—ADV PG 170

M & T Welding Products Corp 703 37th St Dakland Calif (13)

M & W ELECTRIC MFG CO INC S Walnut St

(P O Box 87 East Palestine Ohie (1-9-12-13)—ADV PG 165

MADISON EQUIPMENT CO 5405 Detreit Ave Cleve-

MADISON EQUIPMENT CO 5405 Detrait Ave Cleve-land 2 Ohio (1-2-5-9)—ADV PG 167 Marco Industries 207 S Helena St Anaheim Calif (2) Mari (Clayton) & Co 1900 Dempster St Evansten

III (5)
Mason (L E Co) 98 Business St Hyde Park) Bostan
36 Mass (4-5-8-13)

McCAFFREY MFG & SUPPLY CO 1840 W 14 St
Chicago 8 III (13)—ADV PG 166
McKinley (Ben P) Co 522 S Clinton St Chicago 7
III (2)
Merculo Mfr Co 2016

III (22)
Merwin Mfg Co 19th & German Sts Erie Pa (9)
Metalectrics Inc 677 Broadway N Y 12 NY (1
thru 6-9-11-12-13)
Metro Casting Co Inc 47 Grattan St Brooklyn 37
NY (1-2)

Midwest Electric Mfg Co 1639 Walnut St Chicago 12 III (2-5-9-11-13)

12 III (2-5-9-11-13)

MINERALLAC ELECTRIC CO 25 N Peeria St Chicago 7 III (9-12)—ADV PG 172-175

MISNER MFG CO INC 202-208 Walton St Syracuse 2 NY (12)—ADV PG 166

Multa-A-Frame DIV Ainsworth Precision Castings Co 1471-77 & Atwater St Detroit 7 Mich (9) National Electric Products Corp Gateway Cert 140 Stamwix St Pittsburgh 22 Pa (1-2-5) OZ ELECTRIC MFG CO INC 262 Bond St Brook-lyn 17 NY (2-7-12)—ADV PG 126 PLM Products Inc 3871 W 150 St Cleveland 11 Ohio (12) Paine Co Fullerton Ave & Westgate Rd Addison III (9) Pipe Coupling Mfrs Inc P 0 Box 488 Martins Ferry Ohie (2-5-11) Ferry Ohie (2-5-11)
Pittsburgh Reflector Co Oliver Bldg Mellon Square
Pittsburgh 22 Pa (9)
Pittsburgh Standard Conduit
Pittsburgh 23 Pa (2-5-11)
Porcelain Preducts Inc 224 N Patterson St Carey
Ohie (13)

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Oak-

t St 3)-

leve-Calif

nsten

oston

4 St

188 7

m 37

icago Chi-

Syra-

Porcelain Pr Ohie (13) Pyle-National Co 1344 N Kostner Ave Chicago 51 111 (1-2-3-4-5-9-12-13) Ramco Mfg Cs 540 Westfield Ave W Roselle Park NJ (9)

mJ 17/ Ratam Mfg Cs 10 Wall St (P 0 Box 1745) New Haven 7 Cenn (1-2-5-9-11-13) Raybestes-Manhattan Inc 61 Willett St Passaic NJ (8) Red Seal Electric Co 10307 Detroit Ave Cleveland

Red Seal Electric Co 10307 Detroit Ave Cleveland 2 Ohio (2-12)
Republic Steel Corp Steel And Tubes Div 224 E 131 St Cieveland 8 Ohio (2-5)
Reynolds Metais Co Richmond 18 Va (2)
Richards (1 R) Co P O Box 482 Carnegie Pa (2-9-11-12-13)
Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa (2)
Relier (Wm G) Inc 152 Library 152 Library 152 Library 153 Li

Roller (Wm G) Inc 159 Liberty Ave Mineola NY (1-2-11-12-13) Rusgreen Mfg Ce 14262 Birwood Ave Detroit 38 Mich (9) Russell & Stell Co Inc 125 Barclay St NY 7 NY (5-12)

Co-1Z)
So-Cal Electre Products Inc 4423 W Jefferson Blvd
Los Angeles 16 Calif (1)
Spang-Chalfant Div National Supply Co Two Gateway Center (P O Box 41e) Pittsburgh 30 Pa
(2-5) Spring City Electrical Mfg Co Spring City 85 Pa

(7)
STEEL CITY ELECTRIC CO 1207 Columbus Ave
Pittsburgh 33 Pa (1-2-3-6-9-13)—ADV PG 152
Steel Electric Products Co Inc 5602 18th Ave
Brooklyn 4 NY (1 thru 6-8 thru 13)
STEELDUCT CO Republic Steel Bldg Youngstown
Olio (2-5-11)—ADV PG 143

TA Mfg Corp 4607 Alger St Los Angeles 39 Calif

(9) May Co Greg & Hammond Sts Carnegle Pa (2-3-9-11-12-13)
Thiel Tool & Engineering Co 1417 N Market St St Louis 6 Me (9)
THOMAS & BETTS CO 36 Butler St Elizabeth 1 NJ (1 Hru 6-9-11-13)—ADV PG 155
Thompson Mfe Co 611 Stevens St Geneva III (9)
Tomic Sales & Engineering Co 20000 Sherwood Ave Detroit 34 Mich (1-2)
Triangle Conduit & Cable Co Inc Triangle & Jersey Aves New Brunswick NJ (2-4-5)
Union Insulating Co Inc Box 351 Parkersburg W Va (2) Union Insulating Co Inc Box 351 Parkersburg
W Va (2)
Unistrut Products Co 933 Washington Blvd Chicago 7 III (9)
Utility Service Co Inc 1620 13th St (P 0 Box 102) Racine Wis (13)
W Fitting Co 711 Cherry St Phila 6 Pa (2-5-7-9-13-14)

Specialties 775 Main St New Rochelle NY

(9)
Walker Brothers End St Conshohecken Pa (2-5)
WEAVER (J A) CO 2110 Howard St St Louis 6
Mo (1-2-5-9-13)—ADV PG 171
WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1 thru 14)—ADV PG
2nd Cover

Znd Cover
Yerkville Metal Products Co 677 Broadway N Y
12 NY (2-6-9-11-12)

YOUNGSTOWN SHEET AND TUBE CO Stambaugh
Bldg Yaungstewn 1 Ohio (2-5)—ADV PG 161

7F. ELECTRICAL METALLIC TUBING

Steel, plastic coated
 Aluminum

Lightweight conduit; frequently called "EMT" or "Thinwall"

Aluminum Co of America 1501 Alcoa Bidg Pitts-burgh 19 Pa (3)

CLIFTON CONDUIT CORP 3300 Eastbourne Ave Baltimore 24 Md (1)—ADV PG 107

General Electric Co Construction Materials Div Conduit Products Dept 1285 Boston Ave Bridge-port 2 Comn (1-2) port 2 Cenn (1-2)
Laclede Steel Co Arcade Bidg St Louis 1 Me (1)
Mark (Clayten) & Co 1900 Dempster St Evanston
III (2)

III (L)
National Electric Products Corp Gateway Center
140 Stanwix St Pittsburgh 22 Pa (1)
Nikah Tube Co 5000 S Whipple St Chicago 32
III (1) Pittsburgh Standard Conduit Co 61 Bridge St Pittsburgh 23 Pa (1)

Republic Steel Corp Steel And Tubes Div 224 E

131 St Cleveland 8 Ohio (1-2)

Spang-Chaifant Div National Supply Co Two Gateway Center (P 0 Box 416) Pittsburgh 30 Pa (1)

STEELDUCT CO Republic Steel Bidg Youngstown Ohio (1)—ADV PG 143

TRIANGLE CONDUIT & CABLE CO INC Triangle & Jersey Aves New Brunswick NJ (1)—ADV PG General Electric Co Corduit Products Dept 1

ANALYCE REPUBLIES End St. Combinators 20 Conduit Products Dept 1

WALKER BROTHERS End St Conshohocken Pa (1)
 ADV PG 141
 YOUNGSTOWN SHEET AND TUBE CO Stambaugh
 Bidg Youngstown 1 Ohio (1)—ADV PG 161

For concealed passage of conductors beneath floor. For structurally-integrated systems, see "Cellular Floor Raceways".

OGATEWAY ENGINEERING CO 3233 W Grand Ave Chicago 51 III—ADV PG 104-105 General Electric Co Construction Materials Div Conduit Products Dept 1285 Boston Ave Bridge-port 2 Conn Howard Electric Co 1950 Ruby St Melrose Park

III
National Electric Products Corp Gateway Center
140 Stamwkx St Pittsburgh 22 Pa
Orangeburg Mfg Co Inc Orangeburg NY

WALKER BROTHERS End St Conshohocken Pa—
ADV PG 141

7G. FLEXIBLE METALLIC CONDUIT

1. Standard 2. Liquid-tight

Spirally wound steel strip, interlocked to provide flexible enclosure for conductors.

OAMERICAN BRASS CO AMERICAN METAL HOSE DIV P 0 Box 791 Waterbury 20 Conn (2)—ADV PG 103 Metal Moulding Co 146 Coit St Irvington

American Metal Moulding Co 146 Coit St Irvington NJ (1.2)
American Metal Moulding Co 146 Coit St Irvington NJ (1)
Columbia Cable & Electric Corp 255 Chestnut St Brooklyn 8 N Y (1.2)

ELECTRI-FLEX CO Roselle III (2)—ADV PG 158
Electrical Fittings Corp 37-50 57th St Woodside 77 NY (1.2) 77 NY (1-2)
Ettco Wire & Cable Corp 75 Onderdonk Ave Brooklyn 37 NY (1)
Plexonics Corp 1430 S Third Ave Maywood III (1-2)
Gednav Electric Corp

111 (1-2)
Gedney Electric Co Americas Bldg Radlo City
N Y 20 N Y (1-2)
GRAYSAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (1)—ADV PG 2
International Metal Hose Co Ashford Ave Believue Ohio (1-2) Marco Industries 207 S Helena St Anahelm Calif (1)

Midwest Electric Mfg Co 1639 Walnut St Chicago 14 III (1)
National Electric Products Corp Gateway Center
140 Stanwix St Pittsburgh 22 Pa (1)
Thepitt Mfg Co Gregg & Hammond Sts Carnegle
Pa (1)

as & Betts Co 36 Butler St Elizabeth 1 NJ (1-2)

(1-2)
Tomic Sales & Engineering Co 20000 Sherwood
Ave Detroit 34 Mich (1)
Triangle Conduit & Cable Co Inc Triangle & Jersey
Aves New Brunswick N J (1)
Universal Metal Hose Co 2157 S Kedzle Ave
Chicago 23 III (1-2)
Wagner Malleable Products Co 222 W Adams St
Chicago 6 III (1)

7L. WIREWAY

Covered troughs for continuous enclosure of conductors.

Alwalt Mfg Co 1706 Lapham Dr Modesto Calif Columbia Metal Box Co 260 E 143 St N Y 51 NY
Eliza Metal Products Co Box 408 Bridgeville Pa
General Electric Co Industrial Power Components
Div Distribution Assemblies Dept 41 Woodford
Ave Plainville Con
General Metals Inc 858 Goldsbro Greensboro NC
Hoffman Engineering Corp 1050 Tyler St Anoka
Minn

Minn
HUENEFELD CO ENGINEERED PRODUCTS DIV
2701 Spring Grove Ave Cincinati 25 Ohio—
ADV PG 140

KEYSTONE MFG CO 23328 Sherwood Rd Warren
Mich—ADV PG 131

Meco Metal Box & Panel Mfg Co Inc 2522 W
Huntingden St Phila 32 Pa
National Electric Products Corp Gateway Center
140 Starwix St Pittsburgh 22 Pa
Queen Products Co Inc Thirteenth & Rowan Sta
Louisville 3 Ky
Taylor Electric Inc 15400 Dale Detroit 23 Mich

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

7H. SURFACE RACEWAY

Metallic
 Non-Metallic

For extension of existing concealed wiring, or for complete installation where concealed wiring is unnecessary or impractical.

Keystone Mfg Co 23328 Sherwood Rd Warren Mich Mitchell Moulding Co 1501 Circle Ave Forest

Keystone Mfg Ce 23328 Sherwood Rd Warren Mich Mitchell Moulding Ce 1501 Circle Ave Forest Park III (2)
National Electric Products Corp Gateway Center 140 Stanwix St Pittsburgh 22 Pa (1)
Saylor Electric C Products Corp 277 Pierce St Birmingham Mich (2)
Steel City Electric Co 1207 Columbus Ave Pittsburgh 33 Pa (1)
Versabar Cerp 14 Whyte St Jersey City NJ Wadsworth Electric Mfg Co Inc 20-34 W 11th St (Bov 272) Covington Ky (1)
Wiremold Co Hartford 10 Conn (1)

Description, Pages Catalog No. & Mfr.

- Fittings for Ceilular Concrete Raceways; 50p (Conduffor)
- Flexible Conduit; 20p; (Marco)
- Conduit Fittings & Specialties; 80p; Cat. No. X-2000 (Ideal-Simplet)
- Conduit Fittings & Bodies; 24p; Cat. No. 38 (Elliot)
- Explosion-Proof Fittings; 92p; Cat. No. 13 (Killark)
- Electrical Fittings; 36p; Cat. No. 57 (M&W)
- Conduit Catalog & Handbook; 40p; Cat. No. 445 (Spang-Chalfant)
- Transite Ducts; 12p; Cat. No. EL-29A (Johns-
- Electrical Conduit & Cable Fittings; 60p; Cat. No. 85 (Thomas & Betts)
- 7-10 Electrical Wiring Products; 64p; Cat. No. D-36 (Midwest)
- 7-11 Clamps & Straps; 28p; Cat. No. 500 (Victor)
- 7-12 Raceways; 17p; Cat. No. 18-255 (G-E)
- 7-13 Steel Underfloor Wiring Systems; 48p; Cat. No. 18-87UF (G-E)
- 7-14 Conduit Reference Data; 24p; Cat. No. RD-2 (Pittsburgh Standard)

7J. TROLLEY DUCT

Duct with busbars or conductors accessible to sliding shoes or connectors for power

BullDog Electric Products Co 7610 Joseph Campau Detroit Mich
Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III
Federal Pacific Electric Co 50 Paris St Newark 5

NJ Feedrali Corp 125 Barciay St N Y 7 NY General Electric Co Industrial Power Components Div Distribution Assemblies Dept 41 Woodford Ave Plainville Con Insul-8-Corp 1369 Industrial Rd San Carios Calif

- 7-15 Fibre Conduit; 12p; Cat. No. 52 (Orangeburg)
- Underfloor Duct System; 16p; Cat. No. 201 7-16 (Orangeburg)
- 7-17 Bus Duct; 24p; Cat. No. AD-30-660 (West-
- 7-18 Lighting-Type Busway; 12p; Cat. No. GEA-6170 (G-E)
- 7-19 Plug-In Busway; 12p; Cat. No. GEA-6172A (G-E)
- 7-20 Aluminum Plug-In Busway; 24p; Cat. No. GEA-6173) (G-E)
- 7-21 Low-Voltage-Drop Feeder Busway; 12p; Cat. No. GEC-1332 (G-E)
- 7-22 Fittings, Controls & Receptacles; 78p; Cat. No. 57 (Pyle-National)

- 7-23 Fittings & Boxes; 50p; Cat. No. 6155 (Rat-tan)
- 7-24 Bus Duct; 20p; Cat. No. 104 (Zinsco)
- 7-25 Conduit Fittings; 28p (Mason)
- Wireways & Auxiliary Fittings; 24p; Cat. No. 157-A (Keystone
- 7-27 Plug Duct Busway; 24p; Cat. No. 300 (Continental Electric Equipment)

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the

Electrical Products Guide" when ordering. Prices are subject to chanae.

American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.: Steel Electrical Raceways, 131p (No Charge) Design Manual on Steel Electrical Raceways, 137p.

Building Research Institute, National Academy of Sciences, Washington, D. C.: Floor-Celling and Service Systems in Multi-Story Buildings, 141p. Price: \$4.00

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price: \$1.50

SECTION 8. MOTORS & GENERATORS

For flexible reference, motors are listed in four classifications: size, design, enclosure, and application.

8A. MOTORS-SIZE

Integral horsepower
 Fractional horsepower
 Sub-fractional (miniature)

Mfg Co Inc Lake Park Blvd Alliance Ohio (3)

Allis (Louis) Co 427 East Stewart St Milwaukee 1 Wis (1)

Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (1) West Washington

American Electronics Inc 655 Wes Baldor Electric Co 4353 Duncan Ave St Louis 10

Barber-Colman Co P O Drawer 99 Rockford III (3) Bodine Electric Co 2254 West Ohio St Chicago 12 III (2-3)

Bague Electric Mfg Co 52 Iowa Ave Paterson 3 NJ (1-2)

Bristol Motor Div Vocaline Co of America Inc Coulter St Old Saybrook Cenn (3) Brook Motor Corp 3553 W Peterson Ave Chicago 45 III (1)

Electric Co 1806 Pine St St Louis 3 Mo

(1-2)
Chandeyson Electric Co 4984 Bingham Ave St
Louis 16 Mo (1)
Cleveland Electric Motor Co 5213 Chester Ave
Cleveland 3 Ohio (1-2)
Continental Electric Co Inc 325 Ferry St Newark
St J (1) 3376 Clay Ch Sarta Clays (18)

Dalmotor Co 1375 Clay St Santa Clara Calif (2-3)

(2-3)
Dayton Electric Mfg Co 126 S Oaklay Blvd Chicago 12 III (1-2)
Delco Products Div General Motors Corp 329 E 1st
St Dayton 1 Ohio (1-2-3)
Diehl Mfg Co 1187 Finderne Ave Somerville NJ

(1-2)
Dumore Co 1300 17th St Racine Wis (2)
Eicor Div F L Jacobs Co 4235 W North Ave
Chicaga 39 III (2-3)
Electra Motors Inc 1110 N Lemon St Anahelm
Calif (1-2)
Electric Indicator Co Inc Camp Ave Springdale
Conn (2-3)

Conn (2-3)

Electric Machinery Mfg Co 800 Central Ave
Minneapolis 13 Minn (1)

Electric Motors & Specialties Inc King & Hamsher
Sts Garrett Ind (2)

Electric Specialty Co 211 South St Stamford
Conn (1-2)

Conn (1-2)
Electro Dynamic Div General Dynamics Corp 163
Ave A Bayonne NJ (1-2)
Elliott Co Jeannette Pa (1)
Emerson Electric Mfg Co 8100 Florissant Ave
St Louis 21 Mo (1-2)
Fairbanks Morse & Co 600 S Michigan Ave Chicago 5 III (1-2)
Fasco Industries Inc Davis & Toppin Sts Rochester
NY (2-3) Franklin Electric Co Inc 400 E Spring St Bluffton Ind (1-2)

eneral Electric Co Apparatus Sales Div Schenec-tady 5 NY (1-2-3)

Hansen Mfg Co Inc RR #1 Princeton Ind (3) Harnischfeger Corp 4400 W National Ave M Harnischfeger Corp 4400 W National Ave Mil-waukee 46 Wis (1)

Haydon Mfg Co Inc 4100 East Elm St Torrington Conn (3)

Haydon (A W) Co 232 N Elm St Waterbury Conn Hertner Electric Co 12690 Elmwood Ave Cleveland 11 Ohio (1-2-3) National Pneumatic Co Inc 125 Amory St Boston 19 Mass (2-3) Howard Industries Inc 1760 State St Racine Wis

Howell Electric Motors Co 409 N Roosevelt Howell Mich (1-2)

Ideal Electric and Mfg Co East First St Mansfield

Ideal Electric and Mfg Co East First St Mansfield Ohio (1 cm) and Mfg Co East First St Mansfield Ohio (1 cm) and Co East First St Mansfield Ohio (1 cm) and Co East First St Mansfield Ohio (1 cm) and Co East First St Mansfield Co East First St England Development Co East First St Mansfield Co East First St Mansfield Co East First St England Co East First St Mansfield Co East First St England Co East First St Mansfield Co East First St England England East First St England England East First St Mansfield Co East First St England England England

Ohio (1-2)

• LEWUS ELECTRIC CO 1254 W Harrison St Chicago

7 III (1-2)—ADV PG 160

Lima Electric Motor Co Inc Findlay Road Lima Ohio (1-2)

while ta-c/ Marathon Electric Mfg Corp Wausau Wisc (1-2) Master Electric Div Reliance Electric & Engineering Co 126 Davis Ave Dayton 1 Ohio (2-1) Motoresearch Co 1600 Junction Ave Racine Wis (1-2-3)

ewman Electric Motors Inc 357 Wilson Ave Newark 5 NJ Q-2) Cackard Electric Div General Motors Corp Warren Ohio (2) Peerless Electric Co 1401 W Market St Warren Ohio (1-2)

Rae Motor Corp 2009 Kewaunee St Racine Wisc (2-3) Reliance Electric & Engineering Co 24701 Euclid
Ave (Cleveland 17 Ohio (1) e (Cleveland 17 Ohio (1) and Electric Co 3001 W Mission Rd Alhambra

Reurand Electric Co 3001 W Mission Rd Alhambra Calif (1-2) Reynolds Electric Co 3000 River Rd River Grove 111 (2) obbins & Myers Inc 1345 Lagonda Ave Spring-field Ohio (1-2-3) angamo Electric Co 11th & Converse Springfield

Sangamo Electric Co 11th & conversion [1] (3)
Shelby Electric Inc East US Highway #421
Shelbyville Ind (1-2)
Small Motors Inc 2076 Elston Ave Chicago 14

Sterling Electric Motors Inc 5401 Telegraph Rd Los Angeles 22 Calif (1-2) Sutton (0 A) Corp 1812 W Second Wichlta Kans

(2-3)
Thermador Electrical Mfg Co 5119 District Blvd Los Angeles 22 Calif (2)
United Electric Machinery Co 1824E N 72 Ct Elmwood Park III (1-2)
United Pressed Products Co 900 S Desplaines St Chicago 7 III (2-3)
U S Electrical Motors Inc 200 E Slauson Ave Los Angeles 54 Calif (1-2)
Universal Electric Co 300 E Main St Owosso Mich (2-3)
WAGNER ELECTRIC CORP 6400 Plumouth Am St

Mich (2-3)

Mich (2-3)

MAGNER ELECTRIC CORP 6400 Plymouth Ave St.
Louis 14 Mo (1-2)—ADV PG 159

Western Gear Corp Electro Products Div 132 W
Colorado St Pasadena 1 Calif (2-3)

WESTINGHOUSE ELECTRIC CORP P 0 80x 868
Pittsburgh 30 Pa (1-2)—ADV PG 77-78-79-80

•WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gatew ADV PG 2nd Pittsburgh 30 Pa (1-2)-

8B. MOTORS-DESIGN

Direct current
 Polyphase induction
 Polyphase synchronous
 Single phase

Allis (Louis) Co 427 East Stewart St Milwaukee 1 Wis (1 thru 4) Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (1-2-3) American Electronics Inc 655 West Washington Blvd Los Angeles 15 Calif (1 thru 4) Baldor Electric Co 4353 Duncan Ave St Louis 10

Mo (1-2-4) Colman Co P O Drawer 99 . Rockford III

Bodine Electric Co 2254 W Ohio St Chicago 12 III (1-2-3-4) Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ (1-2-4)

NJ (1-2-4)

Ristol Motor Div Vocaline Co of America Inc
Coulter St Old Saybrook Conn (4)

Brook Motor Corp 3553 W Peterson Ave Chicago
45 III (2-4) Mo (1 thru 4)

Chandeysson Electric Co 4084 Bingham Ave St Louis 16 Mo (1-2-3)

Cleveland Electric Motor Co 5213 Chester Ave Cleveland 3 Ohio (2) Columbia Electric Mg Co Cleveland 14 Ohio (3) 4519 Hamilton Ave Cleveland 14 Ohio (3) 325 Ferry St Newark

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(1-4)
Dayton Electric Mfg Co 126 S Oakley Blvd Chicago 12 III (2-4)
Delco Products Div General Motors Corp 329 E 1st
St Dayton 1 Ohio (1 thru 4)
Diehl Mfg Co 1187 Finderne Ave Somerville NJ

(2.4)

(2-4)
Dumore Co 1300 17th St Racine Wis (1-2)
Elcor Div F L Jacobs Co 4235 W North Ave
Chicago 39 III (1-4)

Chicago 3 III (1.14)

Electra Motors Inc 1110 N Lemon St Anaheim Calif (2.3-4)

Electra Motors Inc 1110 N Lemon St Anaheim Calif (2.3-4)

Electric Indicator Co Inc Camp Ave Springdale Conn (1 thru 4)

Electric Machinery Mfg Co 800 Central Ave Minneapolis 13 Minn (2-3)

Electric Motors & Specialties Inc King & Hamsher Sts Garrett Ind (4)

Electric Specialty Co 211 South St Stamford Conn (1 thru 4)

Electric Specialty Co 211 South St Stamford Conn (1 thru 4)

Electric Dynamic Div General Dynamics Corp 163 Ave A Bayonne NJ (1-2)

Elliott Co Jeannette Pa (1-2-3)

Emerson Electric Mfg Co 8100 Florissant Ave St Louis 21 Mo (4)

Fairbanks Morse & Co 600 S Michigan Ave Chicago 5 III (1 thru 4)

Fasco Industries Inc Davis & Toppin Sts Rochester NY (1-2-4) Fasco Industrie

tric Co Inc 400 E Spring St Bluffton ind (1-2-4) General Electric Co Apparatus Sales Div Schenec-tady 5 NY (1 thru 4)

GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY 17 NY (1 thru 4)—ADV PG 2-136 Hansen Mfg Co Inc RR #1 Princeton Ind (1-4)

Haydon (A W) Co 232 N Elm St Waterbury Conn (1-4) Conn (1-4) CS 222 N Elm St Waterbury
Holtzer-Cabot Div National Pneumatic Co Inc 125
Amory St Boston 19 Mass (1 thru 4)
Howard Industries Inc 1760 State St Racine
Wis (1 thru 4)
Howard Industries Inc 1760 State St Racine
Wis (1 thru 4)
Howard Industries Inc 1760 State St Racine
Howard Industries Inc 1760 State St Racine
Flower Industries Inc 1760 State St Racine
Geal Electric and Mfg Co East First St Mansfield Ohio (1-2-3)
Iron Fireman Mfg Co Electronics Div 2838 S E
9th Ave Portland 2 Ore (4)
Jack & Heintz Inc 17600 Broadway Cieveland 1
Ohio (2-4)
Kingston Conley Inc North Plainfield NJ (2-4) Ohio (2-4)

Kurz & Root Sales & Engineering Corp 232 East
North Island St Appleton Wis (1 thru 4)

Leland Electric Co 1501 Webster St Dayton 1

Ohio (1-2-4) Lima Electric Motor Co Inc Findlay Road Lima
Ohio (2-4)
Lincoln Electric Co 22801 St Clair Ave Cleveland
17 Ohio (2) Marathon Electric Mfg Corp Wausau Wis (1 thru Master Electric Div Reliance Electric & Engineering Co 126 Davis Ave Dayton 1 Ohio (1 thru 4) lotoresearch Co 1600 Junction Ave Racine Wis (2-3-4) (2-3-4)
Newman Electric Motors Inc 357 Wilson Ave
Newark 5 NJ (2-3-4)
Peerless Electric Co 1401 W Market St Warren
Ohio (1 thru 4) Rae Motor Corp 2009 Kewaunee St Racine Wis Reliance Electric & Engineering Co 24701 Euclid Ave Cleveland 17 Ohlo (1-2) Reuland Electric Co 3001 W Mission Rd Alhambra Calif (2-3-4) Reynolds El Electric Co 3000 River Rd River Grove Robbins & Myers Inc 1345 Lagonda Ave Spring-field Ohio (1-2-3-4) Sangamo Electric Co 11th & Converse Springfield 111 (1-4) Shelby Electric Inc East US Highway #421 Shelbyville Ind (2-3-4)
Small Motors Inc 2076 Elston Ave Chicago 14
III (1-4) III (1-4) Sterling Electric Motors Inc 5401 Telegraph Rd Los Angeles 22 Calif (2-3-4) Sutton (0 A) Corp 1812 W Second Wichita Kans (4) Kans (4)
Technical Electronics Corp 4060 Ince Blvd Culver
City Calif (4)
United Electric Machinery Co 1824E N 72 Ct
Elmwood Park III (4)
U S Electrical Motors Inc 200 E Slauson Ave
Los Angeles 54 Calif (2)
Universal Electric Co 300 E Main St Owosso
Mich (1-4)
MACREP ELECTRIC CORP. 6400 Plumputh Aug St Mich (1-4)

WAGNER ELECTRIC CORP 6400 Plymouth Ave St.
Louis 14 Mo (2-3-4)—ADV PG 159

Western Gear Corp Electro Products Div 132 W.
Colorado St. Pasadena 1 Calif (1 thru 4)

WESTINGHOUSE ELECTRIC CORP P 0 Boy 868
Pittsburgh 30 Pa (1 thru 4)—ADV PG 77-78-79-80

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gatway
Center Pittsburgh 30 Pa (1 thru 4)—ADV PG
2nd Cowe

8C. MOTORS—ENCLOSURE

Drip-proof
 Explosion-proof
 Splash-proof
 Weatherproof
 Hermetic
 Submersible
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Fton nec-Àve (-4) Alliance Mfg Co Inc Lake Park Blvd Alliance Ohio (4) Allis (Louis) Co 427 East Stewart St Milwaukee 1 Wis (1 thru 7) Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (1-2-3-4-7) Baldor Electric Co 4353 Duncan Ave St Louis 10 Mo (1-2-3-4-7) Bodine Electric Co 4054 Bodine Electric Co 2254 W Ohio St Chicago 12 III (7) Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ (1-2-3-4-6-7) Brook Motor Corp 3553 W Peterson Ave Chicago 45 111 (1-3-4-7) Co 1806 Pine St St Louis 3 Mo (1 thru 7)
Chandeysson Electric Co 4084 Bingham Ave St
Louis 16 Mo (1-3-4)
Continental Electric Co Inc 325 Ferry St Newark
5 NJ (1-2-3-7)
Dalmotor Co 1375 Clay St Santa Clara Calif
(7) Depton Electric Mfg Co 126 S Oakley Blvd Chi-Depton Electric Mfg Co 126 S Oakley Blvd Chi-Delco Products Div General Motors Corp 329 E 1st St Dayton 1 Ohio (1-2-5-7) Dith Mfg Co 1187 Finderine Ave Somerville NJ Elcor Div F L Jacobs Co 4235 W North Ave Chicago 39 III (1-2-3-4-7) Electric Indicator Co Inc Camp Ave Springdale Conn (1-3-4-6-7)

Electric Machinery Mfg Co 800 Central Ave Minneapolis 13 Minn (1-3-4-7)
Electric Motors & Specialties Inc King & Hamsher Sts Garrett Ind (4-7)
Electric Specialty Co 211 South St Stamford Conn (1-2-3-4-6-7)
Electro Dynamic Div General Dynamics Corp 163 Ave A Bayonne MJ (1-2-3-4-6-7)
Elliott Co Jeannette Pa (1-2-3-4-6-7)
Elliott Co Jeannette Pa (1-2-3-4-6-7)
Elliott Co Jeannette Pa (1-2-3-4-6-7)
Earbanks Morse & Co 600 S Michigan Ave Chicago 5 III (1-2-3-4-6-7)
Esco Industries Inc Davis & Toppin Sts Rochester NY (1-2-3-4-6-7)
Franklin Electric Co Inc 400 E Spring St Bluffton NY (1-2-3-4-6-7)
Franklin Electric Co Inc 400 E Spring St Bluffton Ind (1-2-3-4-6-7)
General Electric Co Apparatus Sales Div Schenectady 5 NY (1 thru 7)
Hansen Mfg Co Inc RR #1 Princeton Ind (7)
Haydon (A W) Co 232 N Eim St Waterbury Conn (4)
Hertner Electric Co 12690 Elmwood Ave Cleveland 11 Ohio (1)
Holtzer-Cabot Div National Pneumatic Co Inc 125
Amony St Boston 19 Mass (7)
Howard Industries Inc 1760 State St Racine Wis (7) Howard Industries Inc 1760 State St Racine Wis (7)
Howell Electric Motors Co 409 N Roosevelt Howell Mich (1-2-3-4-7)
Howell Electric and Mfg Co East First St Mansfield Ohio (1 thru 7)
Iron Fireman Mfg Co Electronics Div 2838 S E 9th Ave Portland 2 Ore (7)
Jack & Heintz Inc 17600 Broadway Cleveland 1 Ohio (1-2-3-6-7)
Kingston Contex Inc. North Plainfield NJ (1-7) Vinio (1-2-3-6-7)
Kingston Conley Inc.
North Plainfield NJ (1-7)
Kingston Conley Inc.
North Plainfield NJ (1-7)
Kingston Conley Inc.
North Island St Appleton Wis (1-3-7)
Leland Electric Co.
Ohio (1-2-6-7)
Lima Flastric Materia ma Electric Motor Co Inc Findlay Road Lima Ohio (1-2-4-7) Onio (1-2-4-7)
Marathon Electric Mfg Corp Wausau Wis (1-2-3-4-5-7)
Master Electric Div Reliance Electric & Engineer-ing Co 126 Davis Ave Dayton 1 Ohio (1-2-3-4-7) Electric Mfg Corp Wausau Wis (1-2otoresearch Co 1600 Junction Ave Racine Wis (1-7) (1-7)
Newman Electric Motors Inc 357 Wilson Ave
Newark 5 NJ (1-2-3-4-7)
Peerless Electric Co 1401 W Market St Warren
Ohio (1-2-3-4-6-7)
Rae Motor Corp 2009 Kewaunee St Racine Wis
(7) (7)
Reliance Electric & Engineering Co 24701 Euclid
Ave Cleveland 17 Ohio (1 thru 7)
Reuland Electric Co 3001 W Mission Rd Alhambra
Calif (1-3-4-7)
Reynolds Electric Co 3000 River Rd River Grove
11 (1-3) III (1-3)
Robbins & Myers Inc 1345 Lagonda Ave Springfield Ohio (1-2-3-4-7)
Shelby Electric Inc East US Highway #421 Shelbyville Ind (1-3-7)
Small Motors Inc 2076 Elston Ave Chicago 14
III (1-3-4-7) Small Motors inc 2076 Elston Ave Criticago 14

III (2-3-4-7)
Sterling Electric Motors Inc 5401 Telegraph Rd
Los Angeles 22 Calif (2-2-3-4-7)
Sumo Pumps Inc P 0 Box 983 Stamford Conn (6)
United Electric Machinery Co 1824E N 72 Ct
Elmwood Park III (1-2-3-4-7)
U S Electrical Motors Inc 200 E Slauson Ave
Los Angeles 54 Calif (1-2-3-4-7)
Universal Electric Co 300 E Main St Owosso
Mich (1-3-7)
WAGNER ELECTRIC CORP 6400 Plymouth Ave St
Louis 14 Mo (1 thru 7)—ADV PG 159
Western Gear Corp Electro Products Div 132 W
Colorado St Pasadena 1 Calif (1 thru 7)
WESTINGHOUSE ELECTRIC CORP P 0 Box 868
Pittsburgh 30 Pa (1 thru 5-7)—ADV PG 77-7879-80

8D. MOTORS-APPLICATION Brake Gear

1. Brake
2. Gear
3. Aircraft
4. Automotive
5. Railway
6. Mining
7. Marine
8. Timing
9. Oil burner
10. Elevater
11. Pump
12. Crane & hoist
13. Power tool
14. Sewing machine
15. Instrument
16. Fan (2)

Adams Engineering Co 31711 Solon Rd Solon Ohio (2)
Alliance Mfg Co Inc Lake Park Blwd Alliance
Ohio (8-11-16)
Allis (Louis) Co 427 East Stewart St Milwaukee
1 Wis (1-2-9 thru 13-16)
Allis-Chalmers Mfg Co 930 S 70th St Milwaukee
1 Wis (2-7)
American Electronics Inc 655 West Washington
Blwd Los Angeles 15 Calif (1-2-3-15-16)

NJ (3-5-7-11)

Pristol Motor Div Vocaline Co of America Inc
Coulter St Old Saybrook Conn (8)

Brook Motor Corp 3553 W Peterson Ave Chicago
45 Ill (2-10-11-12) 45 III (2-10-11-12)
Century Electric Co 1806 Pine St St Louis 3
Mo (1-2-7-9-10 thru 16)
Cleveland Electric Motor Co 5213 Chester Ave
Cleveland 3 Ohio (1-10-11-12-16)
Continental Electric Co Inc 325 Ferry St Newark
5 NJ (10-11-12)
Dalmotor Co 3378 Claus Co Servic Olive imotor Co 1375 Clay St Santa Clara Calif (1-2-3-8-16) Delco Products Div General Motors Corp 329 E 1st St Dayton 1 Ohio (1 thru 7-9-10-16) Diehl Mfg Co 1187 Finderne Ave Somerville NJ (1-7)Dumore Co 1300 17th St Racine Wis (2-3-15) Eicor Div F L Jacobs Co 4235 W North Ave Chicago 39 III (1-3-5-6-7-11-15-16) Electra Motors Inc 1110 N Lemon St Anaheim Calif (1-2-10-11-12-13-16)
Electric Indicator Co Inc Camp Ave Springdale Conn (1-2-3-5-6-7-8-11-13-15-16) Conn (1-2-3-5-6-7-8-11-13-15-16)
Electric Indicator Co Inc Camp Ave Springdale
Conn (3-5-6-7-8-11-15-16)
Electric Machinery Mfg Co 800 Central Ave Minneapolis 13 Minn (6-11-12-16)
Electric Motors & Specialties Inc King & Hamsher
Sts Garrett Ind (16)
Electric Specialty Co 211 South St
Conn (1-2-3)
Electrical Mfg Co 425 Lake Ave Racine Wis (14)
Electro Dynamic Div General Dynamics Corp 163
Ave A Bayonne NJ (1-2-3-4-5-6-7-8-9-10-1112-13-14-15) Ave A Bayor 12-13-14-15) 12-13-14-15)
Elliott G. Jeannette Pa (1-2-9-11-12-16)
Fairbanks Morse & Co. 600 S Michigan Ave Chicago 5 III (1-2-4-5-6-7-9 thru 13-16)
Faik Corp. 3022 W Ganai St. Milwaukee 1 Wis (2) Fasco Industries Inc Davis & Toppin Sts Rochester NY (9-11-13-15-16) Franklin Electric Co Inc 400 E Spring St Bluffton Ind (2-11-12-13-16) Ind (2-11-12-13-16) and a Spring 3: Builton ind (2-11-12-13-16) General Electric Co Apparatus Sales Div Schenectady 5 NY (1 thru 7-9 thru 14) Hansen Mfg Co Inc RR #1 Princeton Ind (8-15) Harnischfeger Corp 4400 W National Ave Milwaukee 46 Wis (12) Haydon (A W) Co 232 N Elm St Waterbury Conn (8-15) Holtzer-Cabot Div National Pneumatic Co Inc 125 Amory St Boston 19 Mass (2-8-15) Howard Industries Inc 1760 State St Racine Wis (2-3-4-5-8-13-14-15-16) Howelf Electric Motors Co 409 N Roosevelt Howelf Mohd (1-2-10-11-12) Ideal Electric and Mfg Cn East First St Mansfield Ohio (6-7-11-12-16) International Register Co 2620 W Washington Blwd International Register Co 2620 W Washington Blvd Chicago 12 III (8) International register to 2000 W Washington Chicago 12 111 (8)
Iron Fireman Mfg Co Electronics Div 2838 S E 9th Ave Portland 2 Ore (9-16)
Jack & Heintz Inc 17600 Broadway Cleveland 1 Ohio (11-12-13-14) gston Conley Inc North Plainfield NJ (11-12-Kingston Conley and 13-16)

13-16)

Kurz & Root Sales & Engineering Corp 232 East North Island St Appleton Wis (10)

Leeds & Northrup Co 4970 Stenton Ave Phila 44 Pa (13) Leland Electric Co 1501 Webster St Dayton 1 Ohio (1-3-11-12-13) Lima Electric Motor Co Inc Findlay Road Lima Ohio (1-2-11-13-16) Electric Mfg Corp Wausau Wisc (6-7-Marathon Electric 9-11-13-16)
9-11-13-16)
Master Eletric Div Reliance Electric & Engineering
Co 126 Dayis Ave Dayton 1 Ohio (1-2-7-10-Minneapolis-Honeywell Regulator Co Industrial Div Wayne & Windrim Aves Phila 44 Pennsylvania (15) Morse Chain Co Borg Warner Corp Ithaca NY (2) Motoresearch Co 1600 Junction Ave Racine Wis Packard Electric Div General Motors Corp Warren Ohio (9-11-13-16) perless Electric Co 1401 W Market St Warren Ohio (1-6-7-10-11-12-13-16) Peerless Rae Motor Corp 2009 Kewaunee St Racine Wisc (1-2-14) (1-2-14)
Reliance Electric & Engineering Co 24701 Euclid
Ave Cleveland 17 Ohio (1-2-6-7-10-11-12-13)
Reuland Electric Co 3001 W Mission Rd Alhambra
Calif (1-2-9-10-11-12-16)
Reynolds Electric Co 3000 River Rd River Grove
III (16)
Robbins & Myers Inc 1345 Lagonda Ave Springfield Ohio (8 thru 16)
Sangamo Electric Co 11th & Converse Springfield
III (8) III (8)
Shelby Electric Inc. East US Highway #421 ShelbyVille Ind (1-2-11-12-13-16)
Small Motors Inc. 2076 Elston Ave Chicago 14
III (9-11-14-16)
Sterling Electric Motors Inc. 5401 Telegraph Rd
Los Angeles 22 Calif (1-2) 203

Baldor Electric Co 4353 Duncan Ave St Louis 10 Mo (7) Barber-Colman Co P O Drawer 99 Rockford III (2-3-15-16)

ernina Sewing Machine Co 29 W 35 St NY 1 NY (14) Bodine Electric Co 2254 W Ohio St Chicago 12 III (8-11-13-14-15) Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ (3-5-7-11)

Pumps Inc P O Box 983 Stamford Conn Sumo (11) (11)
Sutton (0 A) Corp 1812 W Second Wichita Kans (16)
United Electric Machinery Co 1824E N 72 Ct Elmwood Park III (1-2)
US Electrical Motors Inc 200 E Slauson Ave Los Angeles 54 Calif (2-3-10-11-16)
Universal Electric Co 300 E Main St Owosso Mich (9-11-16)
Western Gase Corp Electro Products Div 132 W

Mich (9-11-16) estern Gear Corp Electro Products Div 132 W Colorado St Pasadena 1 Calif (1-2-3-8-11-15-

WESTINGHOUSE ELECTRIC CORP P 0 Box 868 Pittsburgh 30 Pa (1 thru 7—9 thru 13)—ADV PG 77-78-79-80

RE. GENERATORS

1. Alternating current 2. Direct current

For changing mechanical energy to electri-cal energy; often called "dynamos" or "alternators".

Allis (Louis) Co 427 East Stewart St Milwaukee 1 Wis (1-2) Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (1-2) 1 Wis (1-2)
American Electronics Inc 655 West Washington
Blvd Los Angeles 15 Calif (1)
Bogue Electric Mfg Co 52 Iowa Ave
NJ (1-2) Electric Co 1806 Pine St St Louis 3 Mo (1-2) Mo (1-2)
Chandcysson Electric Co 4084 Bingham Ave St
Louis 16 Mo (1-2)
Columbia Electric Mfg Co
Cleveland 14 Ohlo (1-2)
Continental Electric Co Inc 325 Ferry St Newark
5 NJ (1-2) 5 NJ (1-2)
Crocker-Wheeler Div Elliott Co Ampere NJ (1-2)
D & R Ltd 402 E Gutierrez St. P 0 Box 1500
Santa Barbara Calif (1)
Dalmetor Co 13775 Clay St. Santa Clara Calif (1-2) Dalmeter Co 1375 Clay St Santa Clara Calif (1-2)

Delco Products Div General Motors Corp 329 E 1st St Dayton 1 Ohio (1-2)

Elcor Div F L Jacobs Co 4235 W North Ave Chicago 39 II (1-2)

Electric Indicator Co Inc Camp Ave Springdale Conn (1-2)

Electric Machinery Mfg Co 800 Central Ave Minneapolis 13 Minn (1)

Electric Specialty Co 211 South St Stamford Conn (1-2)

Electric Dynamic Div General Dynamics Corp 163 Ave A Bayonne NJ (2)

Elitott Co Jeannette Pa (1-2)

Fairbanks Morse & Co 600 S Michigan Ave Chicago 5 II (1-2)

Fidelity Electric Co Inc 332 N Arch St Lancaster Pa (1)

Fe (1)

Pa (1)
General Electric Co Apparatus Sales Dlv Schenectady 5 NY (1-2)
Georator Corp Manassas Va (1-2)
Hertner Electric Co 12690 Elimwood Ave Cleveland 11 Ohio (1-2)
Heltzer-Cabot Div National Pneumatic Co Inc 125
Amory St Boston 19 Mass (1-2)
Homelite Div Textron Inc 67 Riverdale Ave Chester NY (1-2)
Ideal Electric and Mig Co East First St Mansfield Ohio (1-2)
Kato Engineering Co 1442 First Ave Manisate
Kato Engineering Co 1442 First Ave Manisate

field Ohlo (1-2)
Kato Engineering Co 1442 First Ave Mankate
Minn (1)
Kurz & Root Sales & Engineering Corp 232 East
North Island St Appletan Wis (1-2)
Leland Electric Co 1501 Webster St Dayton 1
Ohio (1-2)

Ohio (1-2)
Marathon Electric Mfg Corp Wausau Wisc (1-2)
Master Electric Div Reliance Electric & Engineering
Co 126 Davis Ave Dayton 1 Ohio (1-2)
Motoresearch Co 1600 Junction Ave Racine Wis

(1-2)

ONAN (D W) & Sons Inc University Ave S E at

25th Minneapolis 14 Minn (1)—ADV PG 154

Peerless Electric Co 1401 W Market St Warren Ohio (2) Motor Corp 2009 Kewaunee St Racine Wisc Reeve Electronics Inc 609 W Lake St Chicago 6 Robbins & Myers Inc 1345 Lagonda Ave Spring-field Ohio (1)

ingamo Electric Co 11th & Converse Springfield III (2) Small Mi (1-2) Motors Inc 2076 Elston Ave Chicago 14 III

(1-2)
Western Gear Corp Electro Products Div 132 W
Colorado St Pasadena 1 Call! (1-2)
Westinghouse Electric Corp P 0 Box 868 .Pittsburgh 30 .Pa (1-2)
Wincharger Corp E Seventh & Division St Sioux
City 2 I Jowa (1-2)
Winpower Mfg Co Newton I Jowa (1-2)

8F. POWER GENERATING SETS

Steam engine powered
 Steam turbine powered
 Diesel engine powered

4. Carburetor engine powered 5. Gas turbine powered 6. Mercury turbine powered 7. Balancer sets 8. Motor-driven (M-G sets)

Engine-driven generating plants for providing electricity for power or lighting.

Allis (Louis) Co 427 East Stewart St Milwaukse

1 Wis (8)
Allis-Chalmers Mfg Co 930 S 70th St Milwaukse

1 Wis (2-3-4-7-8)
Begue Electric Mfg Co 52 Iowa Ave Paterson 3
NJ (3-8) NJ (3-8)
Caterpillar Tractor Co Engine Div Abington & N
Perry Sts Peoria III (3)
Chandeysson Electric Co 4084 Bingham Ave St
Louis 16 Mo (3-4-8)
Chicago Pheumatic Tool Co 6 E 44 St NY 17
NY (3) NY (3) Columbia Electric Mfg Co 4519 Hamilton Ave Cleveland 14 Ohio (8) Coppus Engineering Corp 344 Park Ave Worcester 10 Mass (2) 10 Mass (2)

8 R Ltd 402 E Gutierrez St P 0 Box 1500
Santa Barbara Calif (4-8)
Dayton Electric Mfg Co 126 S Oakley Bivd Chicago 12 III (4)
Delta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III (3-4)
Detroit Diesel Engine Div General Motors Corp 13400 W Guter Drive Detroit 28 Michigan (3)
Elcor Div F L Jacobs Co 4235 W North Ave Chicago 39 III (8)
Electric Indicator Co Inc Camp Ave Springdale Electric Indicator Co Inc Camp Ave Springdale Coon (8) Comm (6) Carlos Corp Buffalo St Cadiz Ohio (3-4) Elliott (6) Jannette Pa (1-2-3-5-8) Empire Corp 1566 S 83rd St Milwaukes 14 Wis (3-4)

(3-4)

Fairbanks Morse & Co 600 S Michigan Ave Chicago 5 III (3-4-7-8)

General Electric Co Apparatus Sales Div Schenectady 5 NY (2-5-6-7)

GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY 17 NY (8)—ADV PG 2

Harrischfeper Corp 4400 W National Ave Milwaukee 46 Wis (3)

waukee 46 Wis (3)
Hertner Electric Co 12690 Elmwood Ave Cleveland
11 Ohio (7-8)
Homelite Div Textron Inc 67 Riverdale Ave Port
Chester NY (4)
Howard Industries Inc 1760 State St Racine Wis

International Fermont Machinery Co Inc Ramape

International Fermont Machinery Co Inc Ramape
NY (4-5)

(ATO ENGINEERING CO 1442 First Ave Mankato
Minn (8)—ADV PG 168

(KATOLIGHT CORP First Ave at Chestnut (P 0 Box
991) Mankato Minn (3-4-5-7)—ADV PG 158

Kohler Co Kohler Wis (3)

Kurz & Root Sales & Engineering Corp 232 East
North Island St Appleton Wis (8)

Master Electric Div Reliance Electric & Engineering Co 126 Davis Ave Dayton 1 Ohlo (8)
Moorn Mfg Co 108 N Jefferson St Chicage 6

10 Motoreserch Co 1600 Junction Ave Racine Wis Motoresearch Co 1600 Junction Ave Racine Wis (4)

(4)
Nordberg Mfg Co 3073 S Chase Ave Milwaukee 1
Wis (3)

ONAN (D W) & SONS INC University Ave S E at
25th Minneapolis 14 Minn (3-4)—ADV PG 154
Petter Diesel Engine Div Brush Aboe Inc 34-14
58th St Woodside 77 NY (3)
Potter & Rayfield Inc P O Box 1042 Atlanta Ga Pyle-National Co 1344 N Kostner Ave Chicago 51 111 (2) Ready-Power Co 11231 Freud Ave Detroit 14 Mich (3-4) Mich (3-4)
Reliance Electric & Engineering Co 24701 Euclid
Ave Cleveland 17 Ohio (8)
Thor Power Tool Co 175 N State St Aurora III

(4)
Tocco Div Ohio Crankshaft Co 3800 Harvard Ave
Cleveland 5 Ohio (8)
United States Motors Corp
kosh Wis (3-4)
Universal Motor Co 438 Universal Dr Oshkosh Universal Mo Wis (3-4)

Wis (3-4)
Waukesha Motor Co Waukesha Wis (3-4)
Westinghouse Electric Corp P O Box 868 .Pittsburgh 30 Pa (1-2-5-8)
Wincharger Corp E Seventh & Division St Sloux
City 2 Iowa (4) City 2 Iowa (4)
Winpower Mfg Co Newton Iowa (3-4)
Young Engine Corp P O Box 532 Canton Ohio (4)

8G. DYNAMOTORS

Rotating machine for changing dc power from one voltage to another.

Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ
Carter Motor 2711 W George St Chicago 18 III
Continental Electric Co Inc 325 Ferry St Newark
5 NJ
Dalmotor Co 1375 Clay St Santa Clara Calif
Elcor Div F L Jacobs Co 4235 W North Ave Chicago 39 III cago 39 III Electric Specialty Co 211 South St Stamford

General Electric Co Apparatus Sales Div Sche-General Electric Co Apparatus Sales DIV Scha-nectady 5 NY Holtzer-Cabot Div National Pneumatic Co Inc 125 Amory St Boston 19 Mass Howard Industries Inc 1760 State St Racine Wis Reliance Electric & Engineering Co 24701 Euclid Ave Cleveland 17 Ohio Sangamo Electric Co 11th & Converse Springfield III Small Motors Inc 2076 Eiston Ave Chicago 14 Wagner Electric Corp 6400 Plymouth Ave St Louis 14 Mo Westingheuse Electric Corp P O Box 868 Pitts-burgh 30 Pa

8H. EXCITERS

For providing and maintaining magnetic field of motors or generators.

Allis (Louis) Co. 427 East Stewart St. Milwaukee Century creating Co Inc 325 Perry 5

NJ
S NJ
Eleor Div F L Jacobs Co 4235 W North Ave Chicago 39 III
Electric Specialty Co 211 South St Stamford Electric aperians of Conn Elliott Co Jeannette Pa Fairbanks Morse & Co 600 S Michigan Ave Chicago 5 III General Electric Co Apparatus Sales Div Scheneral Electric Co Apparatus Sales Div Sche-nectady 5 NY rtner Electric Co 12690 Elmwood Ave Cleve-land 11 Ohio Hertner Electric Co 12070 Indiana 11 Ohio Ideal Electric and Mfg Co East First St Mansfield Ohio ato Engineering Co 1442 First Ave Mankate

field Ohio
Kato Engineering Co 1442 First Ave Mankate
Minn
Kurz & Root Sales & Engineering Corp 232 East
North Island St Appleton Wis
Marathon Electric Mfg Corp Waussu Wisc
Marathon Electric Div Reliance Electric & Engineering
Co 126 Davis Ave Dayton 1 Ohio
Reliance Electric & Engineering Co 24701 Euclid
Ave Cleveland 17 Ohio
Westinghouse Electric Corp P O Box 868 Pittsburgh 30 Pa
Winpower Mfg Co Newton Iowa

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

Description, Pages Catalog No. & Mfr. *Code

- Fractional Horsepower Motors; 129; Cat. No. 8-1
- Direct Current M-G Sets; 20p; Cat. No. D-103 (Chandeysson) 8-2
- Installation, Operation & Maintenance of M-G Sets; 20p; Cat. No. 1-203 (Chan-
- Motors & Drives; 20p; Cat. No. 100 (Electro
- Motors for Every Operating Requirement; 12p; Cat. No. 800 (Brook)
- D-C Motors; 12p; Cat. No. C-2003 (Re-8-6
- Motor Selector; 12p; Cat. No. B-2103-3 (Reliance)
- A-C Generators; 26p; Cat. No. E1-1B (Elec-

Commutator Motors; 26p; Cat. No. E1-2B (Electric Indicator) 8-9

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- 8-10 Induction Motors & Torque Motors; 40p; Cat. No. E1-3B (Electric Indicator)
- 8-11 Synchronous Motors; 22p; Cat. No. E1-4B (Electric Indicator)
- 8-12 Catechism of Electrical Machinery; 48p; Cat. No. E-100-M (Fairbanks Morse)
- High-Speed Synchronous Motors; 12p; Cat. No. 501 (Ideal)
- High-Speed A-C Generators; 12p; Cat. No. 505 (Ideal) 8-14
- Motors & Power Drives; 64p; Cat. No. 258 (Sterling)
- 8-16 Motor & Generator Application Guide; 12p; Cat. No. 270 (Century)

- 8-17 Domestic Generator Sets; 17p (Empire)
- 8-18 Motors; 20p; Cat. No. 3540 (Diehl)
- 8-19 Commercial Generating Sets; 68p (International Fermont)

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the Electrical Products Guide" when ordering. Prices are subject to change.

National Engineer, 176 W. Adams St., Chicago 3, III.: Electric Motors & Generators: Questions and Answers, 30p. Price: 70¢

University of Illinois Engineering Experiment Station, Urbana, III.: Influence of Polyphase Motors on the Voltage Regu-lation of Circuits Supplying Single-Phase Weider Loads, 79p. Price: \$1.00

Influence of Polyphase Motors on the Voltage Regu-lation of Circuits Supplying Three-Phase Welder Loads, 42p. Price: 40¢

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price: \$1.50

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

SECTION 9. LIGHTING EQUIPMENT AND LAMPS

See Section 5 for fixture hangers and supports, ballasts, and other lamp accessories; dimmers are listed in 3J.

9A. RESIDENTIAL LIGHTING FIXTURES

- A. RESIDENTIAL LIGHTING FIXTURES

 1. Ceiling downlights

 2. Ceiling suspended units

 3. Fluorescent

 4. Vaporproof

 5. Overall ceilings

 6. Wall brackets

 7. Bath mirror lights

 8. Electroluminescent panels

 9. Stair tread lights

 10. Portable lamps (floor, table, desk, bed)

 11. Entrance, porch, driveway, patio lights

 12. Garden lights

 13. Illuminated house numbers
- Abrams Lighting 3432 Market St Philadelphia 4 Pa (3-7)
- Lighting Products Co 230 Eugenia St S W tlanta 3 Ga (1-2-3-6-7-8-11) Atlanta 3
- Attanta 3 Ga (1-2-3-6-7-8-11)
 Acme Lighting & Mfg Co 949 E 31 St Los
 Angeles 11 Calif (3)
 Acme Lite Products Co Congers NY (10)
 Active Specialty Corp Elm St Walden NY (1-2-6-
- 7-10-11) Adalet Mfg Co 14300 Lorain Ave Cleveland 11 Ohio (4)
- Adjusta Post Mfg Co 908 St Clair St Akron 7 Ohio (11) erolux Lights Corp 653 11th Ave New York 36 NY (10)
- Afco Lite Corp 1234 N Paulina St Chicago 22 III (10-11-12)
- Alkco Mfg Co 4242 N Lincoln Ave Chicago 18 III (7-3)All-Brite Light Co 400 S 12 St Reading Pa (3)
 Amplex Corp 111 Water St Brooklyn 1 NY
 (1-6-10)
- Appleton Electric Co 1701-59 Wellington Ave Chicago 13 III (4-12) Arrew Lamps Inc 1270 Broadway New York 1 NY
- Art Metal Co 1814 E 40 St Cleveland 3 Ohio (1-6-7-9-11)
- Art Specialty Co 3720 N Milwaukee Ave Chicago 41 III (6-10)
 Artcraft Lighting Co Inc 248 McKibben St Brooklyn 6 NY (2-6)
 Artistic Lamp Mfg Co Inc 401 Fourth Ave N Y 16 NY (2-10)
- Artoller Corp 139 Main St Lodi NJ (1-2-6-11-12)
- 12)
 Atlas Electric Products Co 319 Ten Eyck St Brooklyn 6 NY (1-9-11)
 B M D & R Inc 7020 Walker St St Louis Park Minneapolis 16 Minn (11)
 Beckley Electric Co Inc 468-470 Grand Ave Brooklyn 38 NY (11-12)
 Benjamin Electric Mfg Co Northwest Highway & Seegers Rd Des Plaines III (11-12)
 Black (M) Mfg Co 300-08 N Third St Phila 6 Pa (11-12)
- Pa (11-12) Blackhawk Industries 250 S Main St Dubuque Iowa (11) ducts Co 5420 Paschall Ave Phila 43
- Calpa Prod Pa (10) on Electric Co 3208 Humboldt St Les Angeles Calif (12)
- 31 Calif (12)
 Columbia Electric & Mfg Co North 2310 Fancher
 Way Spokane Wash (3-5)
 Comet Lamp Co 7 E 35 5t New York 16 NY (2)
 Compco Corp 1800 N Spaulding Ave Chicago 47
 III (1-2-3-6-9-11)
- Condi-Lite Corp 889 Broadway NY 3 NY (1-2)

- Curtis Development & Mfg Co 3244 N 33 St Mil-waukee 16 Wis (13) Inc 6135 W 65th St Chicago 38 Curtis Lighting
- Day-Brite Lighting Inc 6260 N Broadway St Louis 15 Mo (1)
- 15 Mo (1)
 Duralite Lanterns Inc 163 Long Beach Rd Island
 Park NY (11)
 Duray Fluorescent Mfg Co 3318 W Montrose Ave
 Chicago 18 III (3)
 Duro-Test Corp 2321 Hudson Blvd North Bergen
- NJ (3) E J S Lighting Corp 321 E Pico Bivd Los Angeles 21 Califf (1-2-6-10) Eagle Electric Mfg Co Inc 23-10 Bridge Plaza South Long Island City 1 NY (1-2-6-7-9-10-11) Eagle Mfg Co 3508 Avaion Bivd Los Angeles 11 Calif (1-6-10)
- Edmor Lamp Co Inc 1867 Flatbush Ave Brooklyn 10 NY (6-10) Elite Glass Co Inc 111 W 22nd St New York 11 NY (12-66)
- NY (1-2-0)
 Emerson-Pyric Co 140 N Towne Ave (P 0 Box 698)
 Pomona Calif (1-11)
 Esty Mfg Co 112 S Sagamore St Chicago 7 III
 (1-2-3-6-7-11)

- Great Northern Mfg Corp 1056 N Wood St Chi-cago 22 III (3) Guth (Edwin F) Co 2615 Washington Blvd St Louis 3 Mo (1-3-5-6-11)
- 3 Mo (1-3-3-6-1.1)
 addco Aluminum Products Co P 0 Box 128
 Littlestown Pa (11)
 asco Electric Corp 30 Grove Ave New Rochelle
 New (3-12) Holophane Co Inc 342 Madison Ave New York 17 NY (11)
- huse-O-Lite Corp 2430 S Ashland Ave Chicago 7
- Imperial Lighting Products Latrobe Pa (1-2-6-7-11) 11)
 Independent Protection Co Inc 1605-07 S Main St Goshen Ind (11-12)
 Industrial Lamp Cerp 14th & Blaine Sts Eikhart
- Industrial Lamp Cerp 14th & Blaine Sts Elkhart Ind (10)
 International Lighting Mfg Co 1825 N *19 St St Louis 6 Mo (1-2-3-6-7-11-12)
 Jackson Electrical Co 900 W Van Buren St Chicago 7 III (4-11-12)
 Jay Lightling Mfg Co Inc 23-29 Quincy St Brooklyn 5 NY (1-2-6-7)
 K-B Lightling Mfg Co 2101 Byberry Rd Phila 16 Pa (3)
- Kalsan Electric Co Inc 146 Mott St Oceanside L I NY (1-2-6-11)
- NY (1-2-6-11) Kelly Specialty Co 5958-60 Washington Blvd Chi-cago 44 III (1.3) Kent Lighting Corp 500 Johnson Ave Brooklyn 37 NY (1-3-6)

- Keystone Electric Mfg Co 2228 E Tioga St Phila 34 Pa (3-6) Kichler (L D) Co 2101 Superior Ave Cleveland 14 Ohio (1-2-6-7) Killark Electric Mfg Co 3940 Easton Ave St Louis 13 Mo (4-12) Kirlin Co 3455 E Jefferson Ave Detroit 7 Mich (1-9-10-11)

- (1-9-10-11)
 (Niegi Bros Universal Electric Stage Lighting Co Inc 321 W 50 St NY 19 NY (1)
 Kligitte Mfg Co 316 Delancey St Phila 6 Pa (3)
 Leader Lamp Mfg Co 476 Broome St NY 13 NY (1-2-67-11)
- Lightolier Inc 346 Claremont Ave Jersey City 5 NJ (1-2-3-6-7-10-11-12) Litecraft Mfg Corp 100 Dayton Ave Passaic NJ (1-2-3-5-6-9-11)
- Lighting Products Co Box 206 Conyers Ga (3)
- Luminous Ceilings Inc 2500 W North Ave Chicago 47 III (5) Flood Inc 50 Crary Ave Mt Vernon NY
- Magni Flood Inc 50 Crary Ave Mt Vernon NY (11-12)

 Majestic Metal S & S Co Inc 537 Sackett St Brooklyn 17 NY (1-2-6)

 Markel Electric Products Inc 145 Seneca St Buffalo 3 NY (1-2-6-11-12)

 Marks Mfg Co 700 N Carpenter St Chicago 22 III (1-6-10)
- Markstone Mfg Co 1531 N Kingsbury Chicago 22 III (1-2-3-6-7-11-13) III (1-2-3-6-7-11-13)
 Marvel Lamp Co 307 Newark St Hoboken NJ (3)
 Marvin Electric Mfg Co 6-48 Santa Fe Ave Los
 Angeles 21 Calif (1-3-6-11)
 McPhilben Mfg Co Inc 1329 Willoughby Ave
 Brooklyn 37 NY (4-6-7-9-11)
 Mid-West Chandeling - 32th Access (50-6)
- Brooklyn 37 NY (4-6-7-9-11)
 Mid-West Chandelier Co 15th & Gentry (P O Box 7365) North Kansas City 16 Mo (3)
 Miller Co Illuminating Div 99 Center St Meriden
 Conn (1-2-7)
- MiroFlector Co Inc 4 NY (1-2-6-7-10-11) 40 Bayview Ave Inwood L I
- NY (1-2-6-7-10-11)
 Mitchell Lighting Co 1800 N Spaulding Ave Chicago 47 III (1-3)
 Modern Swimming Pool Co Inc 1 Holland Ave
 White Plains NY (4)
 Moe Light Div Thomas Industries Inc 410 S 3rd
 St Louisville Ky (1-2-3-5-6-7-12)
 N L Corp 2480 E 22 St Cleveland 15 Ohio
 (1-11-13)

- 1.11-13)
 Nemco Electric Co 210 Second Ave Seattle 4
 Wash (1.2-4-6-7-11-12)
 Neo-Ray Products Inc 315 E 22 St N Y 10 NY
 (3)
- (3)
 Novelty Lighting Corp
 Ohio (1-11-13)
 Pass & Seymour Inc
 Perfecilte Co 1457 E 40 St Cleveland 3 Ohio
 (4-6-8-9)
- (4-6-8-9)
 Perfect-Line Mfg Corp Old Country Rd & Railroad
 Ave P 0 Box 65 Hicksville L 1 NY (10-11-12)
 Pittsburgh Reflector Co Oliver Bldg Mellon Square
 Pittsburgh 22 Pa (3-5)
 Prescolite Mfg Corp 2:229 Fourth St Berkely 10
 Calif (1-2-6-7-9-10-11)

- Calif (1-2-6-7-9-10-11)
 Progress Mfg Co Inc Castor Ave & Tulip St Phila 34 Pa (1-2-3-6-7-10-11-12)
 Project Fixture Mfg Corp 55 Ongley St Rockville Centre NY (1-2-5-6-7-10-11-12)
 Quaker City Electric Mfg Co 2610 E Pacific St Phila 34 Pa (3)
 Rab Electric Mfg Co Inc 605 E 132 St New York 54 NY (4-11-12)
 Revere Electric Mfg Co 7420 N Lehigh Ave Chicago 48 III (12)
 Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa (10)
- & Stoll Co Inc 125 Barclay St N Y 7 NY Segil (L J) Co 2500 W North Ave Chicago 47 III (1-2-3-11)
- Shaida Mfg Co Inc 156 W Providencia Ave Bur-bank Calif (12)

Southeast Lighting Inc 521 E 20 St Charlotte 1 NC (3) Industries 1508 N Mascher St Phila 22 Pa (11)
Spero Electric Corp 20500 St Clair Ave Cleveland 17 Ohio (4-11-12)
Stabrite Fluorescent Mfg Co 3550 Northwest 49 St Miama Fia (1-3-10-11)
Steber Mfg Co 2700 Roosevelt Rd Broadview III (11-12)
Sternberg Mfg Co 4510 Addison St Chicago 41 III (11)
Stocker & Yale Inc Green St Marbiehead Mass (10) Pa (11) (3)
Stonco Electric Products Co 333 Monroe Ave Kenilworth NJ (4-11-12)
Swivelier Co Inc Nanuet NY (1-2-3-4-6-7-10-12)
Sylvania Electric Products Inc 1740 Broadway New York 19 NY (1-2)
Terado Co 1068 Raymond Ave St Paul 14 Minn (3) (3) Tower Craftsmen Inc 105 Chestnut St Red Bank NJ (10) NJ (10)
Union Insulating Co Inc Box 351 Parkersburg
W Va (10-11-12)
Versen (Kurt) Co 4 Slocum Ave Englewood NJ
(1-2-6-10)
Virden (John C) Co 5009-6103 Longfellow Ave
Cleveland 3 Ohio (1-2-3-4-6-7-11-12-13)
Wakefield Co 731 S Water St Vermillon Ohio
(3-5) Weiss and Biheller Merchandise Corp 584 Broadway N Y 12 NY (1-2-6) Westinghouse Electric Corp Lamp Div Bloomfield NJ (3-4-5-8) hite (0 C) Co 15-21 Hermon St Worcester 8 White (0 Mass (10) ilson (J A) Lighting & Display Inc 516-17 G Daniel Baldwin Bldg Erie Pa (1)

9C. COMMERCIAL, INSTITUTIONAL & IN-DUSTRIAL LIGHTING EQUIPMENT

 Incandescent fixtures
 Fluorescent fixtures
 Mercury & sodium vapor fixtures
 Cold cathode fixtures
 Are lighting equipment 4. Cold cathode fixtures
5. Arc lighting equipment
6. Neon lighting
7. Explosion-proof fixtures
8. Vaporproof fixtures
9. Dust-tight fixtures
10. Complete luminous ceiling systems
11. Warning & exit lighting
12. Pilot & indicating light assemblies
13. Showcase & display lighting
14. Emergency lighting units & systems
15. Stage lighting
16. Church lighting

Abolite Lighting Div Jones Metal Products West Lafayette Ohio (1-9) Abrams Lighting 3432 Market St Philadelphia 4 Pa (2-13)

Pa (2-13) Acme Lighting & Mfg Co 949 E 31 St Los Angeles 11 Calif (2-13) ◆ADALET MFG CO 14300 Lorain Ave Cleveland 11 Ohio (8)—ADV PG 176 Adjustable Fixture Co 104 E Mason St Milwaukee 2 Wis (1) Answorth Lighting Inc 38-10 Twenty-Ninth St LIC 1 NY (1-2) Mfg Co 4242 N Lincoln Ave Chicago 18 III Il-Brite Light Co 400 S 12 St Reading Pa (2-13)

t2-13)
Amplex Corp 111 Water St Brooklyn 1 NY (1-13)
Appleton Electric Co 1701-59 Wellington Ave Chicago 13 III (1-2-3-7-8-9-13)
Art Metal Co 1814 E 40 St Cleveland 3 Ohio (1-13) (1-13)
Artcraft Lighting Co Inc 248 McKlibben St Brooklyn 6 NY (1-2-13)
Atlas Electric Products Co 319 Ten Eyck St Brooklyn 6 NY (1-2-11)
B M D & R Inc 7020 Walker St St Louis Park Minneapolis 16 Minn (1-2-11)
Baker-Barkon Co 1335 S W Morrison St Portland One (1)

Ore (1)
Benjamin Electric Mfg Co Northwest Highway & Seegers Rd Des Plaines III (1-2-3-7-8-9-11-13)

CANNING-PEKARA INC 2144 N Wood St Chicago 14 III (2-13)—ADV PG 147
Capitol Hardware Mfg Co Inc 400 N Leavitt St Chicago III (13)
Canitol Stane Linking Co Inc 400 N Leavitt St Chicago III (13) Capitol Stage Lighting Co Inc. 527 W 45 St New York 36 NY (1-15) Carpenter Mfg Co 2250 Bradley St Somerville 45 Mass (2-7-11-14) Centralite Co Inc Dayton & Central Aves Cincin-nati 14 Ohio (2) Century Lighting Inc 521 W 43 St New York 36 NY (1-13-15) Clean Sweep Co 65341/2 Whittier Blvd Los Angeles 22 Calif (14) Z2 Caint (12) Cold Cathode Lighting Corp. 42-40 27th St. Long Island City. NY (4-7-8-13) Cole (C W) & Co Inc. P. O. Box 3382 Los Angeles 54 Calif (1-2-13-15)

54 Calif (1-2-13-15) Colonial Electric Products Div Colonial Neon Co Inc 1-115 Market St East Paterson NJ (2-4-13) Columbia Electric & Mg Co North 2310 Fancher Way Spokane Wash (2-4-9-10-13) Compco Corp 1800 N Spaulding Ave Chicago 47 III (1-2-13) ondi-Lite Corp 889 Broadway New York 3 NY (1-2)

Cooper Hewitt Electric Co 720-732 Grand St Hoboken NJ (2-3)

CROUSE-HINDS CO Syracuse 1 NY (1-2-3-7-8-9-11-13)—ADV PG 96-97-4th Cover Crownitte Fluorescent Co 7 Roselle St Minzola NY (2-4-10-13) Curtis Lighting Inc 6135 W 65 St Chicago 38 III (1-2-3-13) utler Light Mfg Co 2026 N 22 St Phila 21 Pa (4-13) Cutier Day-Brite Lighting Inc 6260 N Boradway St Louis 15 Mo (1-2-8-11) 15 MO (1-2-6-11)

Bay-Ray Products Inc 1133 Mission St South
Pasadena Calif (2-8-9)

Derrick Light & Equipment Co 1201 E Daggett

(P O Box 414) Fort Worth Tex (7-8-9)

Dialight Corp 60 Stewart St Brooklyn 37 NY

(8-9) Dual-Lite Co Inc 185 Front St Bridgeport 6 Conn (11) Duray Fluorescent Mfg Co 3318 W Montrose Ave Chicago 18 III (2) Duro-Test Corp 2321 Hudson Bivd North Bergen Duro-test
NJ (1-2-11-13)
E J S Lighting Corp 321 E Pico Blvd Los Angeles
21 Calif (1)

Rattery Div McGraw-Edison Co Z1 Calif (1)
Edison Storage Battery Div McGraw-Edison Co
West Orange NJ (14)
Electric Cord Co 21 Spruce St New York 38
NY (11-14) Electric Lighting Inc P O Box 1907 Stockton Calif (2-13)

Calif (2-13)
Electric Re-Light Co 625 S Goodman St Rochester
20 NY (2)
ELECTRIO SILV-A-KING CORP 1535 S Paulina St
Chicago 8 III (1-2-3-4-10-13)—ADV PG 136
Electro-Snap Switch & Mfg Co 4218-30 W Lake
St Chicago 24 III (12)
Elite Glass Co Inc 111 W2 25 t New York 11
NY (1) Emerson-Pryne Co 140 N Towne Ave (P O Box 698) Pomona Calif (1-13) Ender-Monarch Corp 50 Sylvester St Westbury NY (1-2-4-10) Ericson Mfg Co 1660 Hayden Ave Cleveland 12 Ohio (8) Ohio (8)

Everglow Lighting Fixture Co Inc 433 Nepperhan
Ave Yonkers 3 NY (1-2)

Federal Lighting Corp 1425 Rockwell Ave Cleveland 14 Ohio (1-2)

FEDERAL SIGN & SIGNAL CORP 7726 S State
St Chicago 19 III (11-13)—ADV PG 158

Felco Products Inc 8700 Ambassador Row Dallas

19 Tex (2)
Flexo International Corp 3720 N Milwaukee Ave Chicago 41 III (1-2)
Fluores-0-Lite Co Evans Terminal North Broad St Hillside 5 NJ (1-2-13)
Fluorescent Equipment & Mfg Co 5105 Cowan Ave Cleveland 27 Ohio (1-2-13)
Fluorescent Fixtures of California 352 Shaw Rd South San Francisco Calif (2)
Frink Corp 27-01 Bridge Plaza North L I C NV Tex (2) Frink Corp 27-01 Bridge Plaza North L I C NY (1-2-3-13) Frisbie (H C) Co 1120 E Pico Blvd Los Angeles 21 Calif (1) 27-01 Bridge Plaza North L I C NY

Mfg Co Willard Rd Norwalk Conn (1-2-10)
RRCY LIGHTING DIV GARDEN CITY PLATING &
MFG CO 2475 Elston Ave Chicago 47 III
(1-2-3-13)—ADV PG 138 odney Electric Co Americas Bldg Radio City NY 20 NY (8) eneral Lighting Co 248 McKiln Brooklyn 6 NY (1-2-13) Co Americas Bldg Radio City Gibson Mfg Co 1919 Piedmont Circle N E Atlanta

Gibson Mfg Co 1919 Preamons of the Color of Ca (2)
Gleason Sales Co Inc 5809 W Montrose Ave Chicago 34 III (1)
Globe Lighting Products Inc 1710 Flushing Ave Brooklin 37 NY (1-2-13)
GODD MFG CO INC 1015 N Halsted St Chicago 22 III (2)—ADV PG 170
GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY 17 NY (1-2)—ADV PG 2

NY 17 NY (1-2)—ADV PG 2

Light Markarin MfG Corp 1056 N Wood St Chicago

22 III (2-13)
Gruber Bros Inc 125 South First St Brooklyn 11
NY (1-2-13) NY (1-2-13) F) CO 2615 Washington Blvd St Louis 3 Mo (1-2-3-9-13-15)—ADV PG 111 Hasco Electric Corp 30 Grove Ave New Rochelle NY (1-2-13)

NY (1-2-13)

HOLOPHANE CO INC 342 Madison Ave New York

17 NY (1-2-3-8-9-10)—ADV PG 1

House-0-Lite Corp 2430 S Ashland Ave Chicago

7 III (2-13) Electric Co 2255 W Grand Ave Chicago 12 (1-2-11-15) III (1.2-11.15)
III (1.2-11.15)
Ideal-Simplet Fittings Inc 5136 Park Ave Sycamore III (8)
Illuminating Engineering Co 2347 East Nine Mile Rd Hazel Park Mich (4)
International Lighting Mfg Co 1825 N 19 St St Louis 6 Mo (1.2)

JACKSON ELECTRICAL CO 900 W Van Buren St Chicago 7 III (1.3-8-9-13)—ADV PG 156
Joy Mfg Co Electrical Products Div 1201 MacKland Ave St Louis 10 Mo (8-9)
K-B Lighting Mfg Co 2101 Byberry Rd Phila 16 Pa (2)

Pa (2) Pa (2)
Kaisan Electric Co Inc 146 Mott St Oceanside
LI NY (1-2-11-13)
Kayline Co 2480 E 22 St Cleveland 15 Ohio
(1-2)
Kelly Specialty Co 5958-60 Washington Blvd
Chicago 44 III (11) Kenbert-Arpag Co 520 Barretto St Bronx 59 NY (2) Kent Lighting Corp 500 Johnson Ave Brooklyn 37 NY (1-2-10-13) Electric Mfg Co 2228 E Tioga St 34 Pa (2-13)

LLARK ELECTRIC MFG CO 3940 Easton Ave St Louis 13 Mo (1-3-7-8-9-12-13)—ADV PG 109 Kirkland (H R) Co 8 King St Morristown NJ (11) Kirlin Co 3435 E Jefferson Ave Detroit 7 Mich (1-2-13) (1-2-13)
Kliegl Bros Universal Electric Stage Lighting Co Inc 321 W 50 St NY 19 NY (1-2-15)
Kliglite Mfg Co 316 Delancey St Phila 6 Pa Koch & Lowy Mfg Co 201 E 34 St New York 16 NY (1) E) Co P O Box 55424 Indianapolis Kord (Leonard E) Co P O Box 55424 Indianapolis 5 Ind (1-2) Kurtzon (Morris) Inc 1420 S Talman Ave Chicago B III (1-2-11-13) Larco Inc Route 20 East Painsville Ohio (9-11) Light & Power Utilities Corp 1035 Firestone Blvd Memphis 7 Tenn (2-13) Lighting Dynamics Inc 802 W Whittier Blvd Whittier Calif (1-2-13)

winitier Lair (1-2-13) Lighting Products Inc 1549 Park Ave West High-land Park III (2) Lightolier Inc 346 Claremont Ave Jersey City 5 NJ (1-2) NJ (1-2)
Line Material Industries McGraw Edison Co 700
W Michigan St Milwaukee Wis (1-2)
Litecontrol Corp 36 Pleasant St Watertown 72
Mass (1-2-13)

Litecraft Mfg Corp 100 Dayton Ave Passaic NJ (1-2-7-8-9-10-13) Lithonia Lighting Products Co Box 206 Conyers Ga (2-13) Luminous Ceilings Inc 2500 W North Ave Chlcago 47 III (2-10-13) Luxor Lighting Products Inc 350 5th Ave New York 1 NY (1-2) Magni Flood Inc 50 Crary Ave Mt Vernon NY

Magni (13) (13)
Major Equipment Co Inc 4603 W Fullerton Ave
Chicago 39 III (15)
Manning (R A) Co Inc 1810 North Ave Sheboygan
Wis (1-2-16) Inc 4603 W Fullerton Ave

arco Industries 207 S Helena St Anaheim Calif (12) Marco Markstone Mfg Co 1531 N Kingsbury Chicago 22 III (1-2)

Marlou Lights Inc Fanwood NJ (2)
Marvel Lamp Co 307 Newark St Hoboken NJ (2-13)te Mfg Co 2758 Kensington Ave Phila

Pa (2)
McPhilben Mfg Cn Inc 1329 Willoughby Ave
Brooklyn 37 NY (1-2-3-8-9-13)
Meierjohan-Wengler 1102 W 9th St Cincinnati 3

Ohio (1)

Metalcraft Products Co Inc Mascher & Lippincott
Sts Phila 33 Pa (2-13)

Mid-West Chandelier Co 15th & Gentry (P O Box
7365) North Kansas City 16 Mo (2-13)

Midwest Lighting Products Co P O Box 536 Edgewater Branch Cleveland 7 Ohio (1)

Miller Co Illuminating Div 99 Center St Meriden Conn (1-2-3-8-9)

MiroFlector Co Inc 40 Bayview Ave Inwood LI
NY (1-13-15)

Mitchell Lighting Co 1800 N Spaulding Ave Chi-NY (1-13-15)
Mitchell Lighting Co 1800 N Spaulding Ave Chicago 47 III (1-2-13)
Modern Light Co Inc 7809 Maplewood Industrial
Court St Louis 17 Mo (2)

Court St Louis 17 Mo (27)
Mo E Light Div Thomas Industries Inc 410 S 3rd St
Louisville Ky (1-2-13)
Mole-Richardson Co 937 N Sycamore Ave Hollywood 38 Calif (5)
MULTI ELECTRIC MFG INC 4223 W Lake St
Chicago 24 III (1-2-3-8-9)—ADV PG 144
N L Corp 2480 E 22 St Cleveland 15 Ohio
(1-13)

Natale Machine & Tool Co 339 Highway #17 Carlstadt NJ (1-13) National Cathode Corp 5 University Pl New York 3 NY (4) wash (1-2-11-13) eo-Ray Products Inc 315 E 22 St NY 10 NY (1-2-10-13-15) Nepo Mfg Co 4230 N Sayre Chicago 34 III (13) Noel Mfg Co 3 W 18 St New York 11 NY (1) Northern Incandescent Lamp Co 1 Newark St NJ (1) Northern Light Co 1661 N Water St Milwaukee 2 Wis (2-10-13) Overbagh & Ayres Mfq Co 411 S Clinton St Chicago 7 Ili (1-3-8) Unicago 7 III (1-3-8)
Paramount Industries Inc G-1080 Ballanger Rd
Flint 4 Mich (2)
Penetray Corp 615 Front St Toledo 5 Ohio
(1-13-15)

(1-13-15)
Penn (Wm) Fluorescent Light Mfg Co 1429-33 S
23 St Phila 46 Pa (2-13)

PERFECLITE CO 1457 E 40 St Cleveland 3
Ohio (1-3-6-8) — ADV PG 133

Perfect-Line Mfg Corp Old Country Rd & Railroad
Ave P O Box 65 Hicksville NY (8-9-13)
Phillips (Oscar) Co 9701 Reading Rd (Box 21)
Cincinnati 15 Ohio (2-13)
Pistsburgh Reflector Co Oliver Bldg Mellon Square Pittsburgh Reflector Co Oliver Bidg Mellon Square
Pittsburgh 22 Pa (1-2-10-13) Pittsburgh 22 Pa (1-2-10-13)
Portable Light Co Inc 216 William St NY 38
NY (11) Prescolite Mfg Corp 2229 Fourth St Berkeley 10 Calif (1-13)

rrice Bros Inc .4301 W Madison Chicago III (11)
Project Fixture Mfg Corp 55 Ongley St Rockville
Centre NY (1-11) Pyle-National Co 1344 N Kostner Ave Chicago 51 III (7-8-9-11-12) Quadrangle Mfg Co 32 S Peorla St Chicago 7 adrangle Mfg Ci III 1.3-3-7-13)
Quaker City Electric Mfg Co 2810 E Pacific St
Phila 34 Pa (2-13)
Rab Electric Mfg Co Inc 605 E 132 St New
York 54 NY (7-8) Rambusch Decorating Co 40 W 13 St New York 11 NY (1-2) Revere Electric Mfg Co 7420 N Lehigh Ave Chicago 48 III (1-2) Ruby-Philite Corp 32-02 Queens Blvd L I C 1 NY (1-2) MY (1-2) Russell & Stoll Co Inc 125 Barclay St NY 7 NY (7-8-9) Segil (L J) Co 2500 W North Ave Chicago 47 III (2-13) Shalda Mfg Co Inc 156 W Providencia Ave Bur-bank Calif (1-3-8-9-11-13) Silvray Lighting Inc 100 W Main St Bound Brook NJ (1-2-13) mithcraft Lighting 217 Everett Ave Chelsea 50 Mass (2-10) Smithcraft Mass (2-10)
Mass (2-10)
Most Holman Co 321 N Eucalyptus Ave (P 0
Box 4097) Inglewood Callf (1-2-3-8-9-13)
Solar Light Mfg Co 400 N Ashland Chicago 22 Solar Light M III (1-2-13) 58-17 28th Ave Woodside 77 L I Solux Corp 58-17 28th Ave Woodside 77 L I NY (1-2-7-8-11-13) Southeast Lighting Inc 521 E 20 St Charolotte 1 NC (2) 1 NC (2)
Spero Electric Corp 20500 St Clair Ave Cleveland
17 Ohio (1-3-8-12-13)
Stabrite Fluorescent Mfg Co 3550 Northwest 49 St
Miami Fla (1-2-13)
Miami Fla (1-2-13)
Miami Fla (1-2-13) miami Fia (1-2-13) Stamford Metal Specialty Co Inc 429 W Broadway New York 12 N Y (1-2) Standard Electric Time Co 89 Logan St. Springfield 2 Mass (14) leber Mfg Co 2700 Roosevelt Rd Broadview III (1-8-13) Steb ternberg Mfg Co 4510 Addison St Chicago 41 III (1-16) tocker & Yale Inc Green St. Marblehead Mass (2-9-13) Stonco Electric Products Co 333 Monroe Ave Kenilworth NJ (1-3-8-15) Sun-Lite Mfg Co 2555 Bellevue Ave Detroit 7 Mich (1-2-13) Sunbeam Lighting Co 777 E 14 Pl Los Angeles 21 Calif (1-2-13) or Electric Co 83 Laurel St Bristol Conn (15)
Swedish Iron & Steel Corp 910 Westfield Ave Elizabeth NJ (2-13)
Swivelier Co Inc Nanuet NY (1-2-13)
Sylvania Electric Products Inc 1740 Broadway NY 19 NY (1-2-12)
Tedcar Products Co Box 209 Union NJ (11)
Terado Co 1068 Raymond Ave St Paul 14 Minn (2) rt Mfg Co 925 Cherry St Detroit 1 Mich frippe Mfg Co 133 N Jefferson St Chicago 6 III (11) Ultra-Violet Products Inc 5114 Walnut Grove Ave San Gabriel Calif (13)
Union Insulating Co Inc Box 351 Parkersburg W Va (8-9) V V Fitting Co 711 Cherry St Phila 6 Pa (9-13) Versen (Kurt) Co 4 Slocum Ave Englewood NJ (1-13)
Virden (John C) Co 5009-6103 Longfellow Ave Cieveland 3 Ohio (2)
Voigt Co 1636 N Carlisle St Phila 21 Pa (1-2-13-16)
Wakefield Co 731 S Water St Vermilion Ohio (1.2-10) Webb Electric Mfg Co 1701 S W Jefferson St Portland 1 Ore (1) Weiss and Biheller Merchandise Corp 584 Broadway NY 12 . RY (1) Lighting Div 1216 W Westinghouse Electric Corp Lighting Div 1216 W 58th St (P O Drawer 5817) Cleveland 1 Ohio (1-2-3-8-9-13) WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1-2-3-8-9)—ADV PG Vheeler Reflector Co 275 Congress St Boston 10
Mass (1-2-3-8-9-13) fhite (0 C) Co 15-21 Hermon St Worcester 8 Mass (1-2) Mass (1-2)
Wiley (R & W) Inc Dearborn & Bridge St Buffalo
7 NY (2)
Williams (H E) Products Co 106 S Main St
Carthage Mo (2-13)
Wilson (J A) Lighting & Display Inc 516-17 G
Daniel Baldwin Bldg Erie Pa 1-10)
Wiremold Co Hartford 10 Conn (13)
Woodhead (Daniel) Co 15 N Jefferson St Chicago 6
III (8)

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9D. OUTDOOR LIGHTING EQUIPMENT

Woodward Machine Co Lighting Div 4833 Elmhurst Detroit 4 Mich (8-9) Work-O-Lite Co 522 Cortlandt St Belleville 9 NJ

Airport lighting
 Floodlights
 Beacons & Searchlights
 Spotlights

5. Street & Highway lighting
6. Lighting towers & standards
7. Sign lighting
8. Obstruction lighting
9. Traffic signals & controls
10. Service station lighting
11. Marine lighting

Equipment manufactured for specialized commercial and industrial applications. Residential outdoor lighting is included in Residential Lighting.

Abolite Lighting Div Jones Metal Products Co West Lafayette Ohio (2) Abrams Lighting 3432 Market St Philadelphia 4 Pa (4) Afco Lite Corp 1234 N Paulina St Chicago 22

All C2 Al

(2-4)

Beckley Electric Co Inc 468-470 Grand Ave Brooklyn 38 N Y (2-4)

Benjamin Electric Mg Co Northwest Highway & Seegers Rd Des Plaines III (2-5)

Canning-Peara Inc 2144 N Wood St Chicago 14

III (2) Cold Cathode Lighting Corp 42-40 27th St Long Island City NY (5) Cole (C W) & Co Inc P O Box 3382 Los Angeles 54 Calif (4) 54 Calif (4)
Colonial Electric Products Div Colonial Neon Co
Inc 1-115 Market St East Paterson NJ (2-5)
Columbia Electric & Mfg Co North 2310 Fancher
Way Spokane Wash (2)
Compco Corp 1800 N Spaulding Ave Chicago 47
III (2-5)

III (2-5) Cope (T J) Div Rome Gable Cope (T J) Div Rom (T J) Div Rome Cable Corp Collegeville 5

ADV PG 96-97
Cutler Electrical Products Inc 5524 Haverford Ave
Philadelphia Pa (7)
Derrick Light & Equipment Co 1201 E Daggett
(P O Box 414) Fort Worth Tex (2)
Duro-Test Corp 2321 Hudson Blvd North Bergen
NJ (24) Electric Lighting Inc P to Box Art. (5-10)
Electro Silv-A-King Corp 1535 South Paulina St Chicaga 8 III (2-4)
Eireco Corp 2900-18 Cormany Ave Cincinnati 25 Ohio (6)
General Electric Co Apparatus Sales Div Schenectady 5 NY (2-3-5)
Clahe Lighting Products Inc 1710 Flushing Ave Lighting Inc P 0 Box 1907 Stockton Calif

General Liectric Corporation of Control of C

To Not (27)

Thought a control of the control of th Electric Co 2255 W Grand Ave Chicago 12 & Co 6301 Butler Co Pittsburgh 1 Pa

(1.2.5)
Hughey & Phillips Inc 3200 North San Fernando
Blvd Burbank Calif (1-9)

JACKSON ELECTRICAL CO 900 W Van Buren St
Chicago 7 Ill (2-4)—ADV PG 156
Joslyn Mfg & Supply Co 3700 S Morgan St Chicago 9 Ill (5)
Joy Mfg Co Electrical Products Div 1201 Macklind
Ave St Louis 10 Mo (2-4)
K-B Lighting Mfg Co 2101 Byberry Rd Phila 16
Pa (2)
Kalsan Electric Co Inc 2.44 Pa (2) Kalsan Electric Co Inc 146 Mott St Oceanside LI NY (4) Kayline Co 2480 E 22 St Cleveland 15 Ohio (4) Kees (F D) Mfg Co 700 Park Ave Beatrice Neb

(2)
Kenworth Co Winsted 1 Kans (2)
Killark Electric Mfg Co 3940 Easton Ave St Louis 13 Mo (24-45)
Kliegl Bros Universal Electric Stage Lighting Co Inc 321 W 50 St NY 19 NY (2-4)
Koehler Mfg Co 395 Lincoln St Mariboro Mass (2)

(2) (2)
Line Material Industries McGraw-Edison Co 700 W
Michigan St Milwaukee Wis (1-2-3-5)
Magni Flood Inc 50 Crary Ave Mt Vernon NY (2)
Manning (RA) Co Inc 1810 North Ave Sheboygan
Wis (2)
Marbelite Co Inc 179 N 10 St Brooklyn 11 NY
(8)

(8)
McGbillen Mfg Co Inc 1829 Willouphy Ave

(8)
MCPhilben Mfg Co Inc 1329 Willoughby Ave
Brooklyn 37 NY (5)
Melerjohan-Wengler 1102 W 9th St Cincinnatl 3
Ohio (5)
MEYER MACHINE INC Red Wing Minn (6)—ADV
PG 175

PG 175
Midwest Lighting Products Co P O Box 536
Edgewater Branch Cleveland 7 Ohio (2)
Miller Co Illuminating Div 99 Center St Meriden
Conn (2)
Millerbernd Mfg Co Winsted Minn (5-6)
MiroFlector Co Inc 40 Bayview Ave Inwood LI
NY (2-4) Mitchell Lighting Co 1800 N Spaulding Ave Chi-cago 47 III (2)

MULTI ELECTRIC MFG INC 4223 W Lake St Chicago 24 III (1-2-4)—ADV PG 144
Natale Machine & Tool Co 339 Highway #17
Caristadt NJ (2-4)
Nepo Mfg Co 4230 N Sayre Chicago 34 III (2-5)
Overbagh & Ayres Mfg Co 411 S Clinton St Chicago 7 III (2)
Penetray Corp 615 Front St Toledo 5 Ghlo (2)
Penetray Corp 615 Front St Toledo 5 Ghlo (2)
Perfect-Line Mfg Corp Old Country Rd & Raiiroad
Ave P 0 Box 65 Hicksville Ll NY (2-4)
PFAFF & KENDALL 84 Foundry St Newark 5 NJ
(5)—ADV PG 177
Philadelphia Electrical & Mfg Co 1200-36 N 31 St
Phila 21 Pa (2-5)
Phillips (Oscar) Co 9701 Reading Rd (Box 21)
Cincinnati 15 Ohio (2-10)
Pittsburgh Reflector Co Oliver Bldg Mellon Square

Pittsburgh 22 Pa (2-4)
Project Fixture Mfg Corp 55 Ongley St Rockville
Centre NY (4) Pyle-National Co 1344 N Kostner Ave Chicago 51 sadrangle Mfg Co 32 S Peoria St Chicago 7 III (2)

Rab Electric Mfg Co Inc 605 E 132 St New York 54 NY (2-45)

Revere Electric Mfg Co 7420 N Lehigh Ave Chicago 401 (1-2-4-5)

Rodal El (1-2-4-5) Rostan Corp 5660 59th St Maspeth 78 LI NY Rusgreen Mfg Co 14262 Birwood Ave Detroit 38 Mich (5) Ryther Purdy Lumber Co 501 Tiffany St NY 59 NY (5-6) NY (5-6)
Shalda Mfg Co Inc 156 W Providencia Ave Burbank Calif (2-4)
Smoot-Holman Co 321 N Eucalyptus Ave (P O Box 4097) Inglewood Calif (2)
Solar Light Mfg Co 400 North Ashland Chicago 22 III (2)
Spero Electric Corp 20500 St Clair Ave Cleveland 17 Ohio (2-4)
Stabrite Fluorescent Mfg Co 3550 Northwest 49 St Miami Fla (2)
Steber Mfg Co 2700 Roosevelt Rd Broadview III (2-4)
Stonco Electric Products Co 333 Monroe Avenue (2-4) Stonco Electric Products Co 333 Monroe Ave Kenilworth NJ (2-4) Sunbeam Lighting Co 777 E 14th PI Los Angeles 21 Calif (5) Swivelier Co Inc Nanuet NY (2-4) Thompson Electric Co P O Box 873 Cleveland 22 Ohio (5)

Union Metal Mfg Co 1432 Maple Ave Canton 5 Utilities Service Co 1 Pine St Allentown Pa (5)
WESTINGHOUSE ELECTRIC CORP P 0 Box 868
Pittsburgh 30 Pa (5-6)—ADV PG 77-78-79-80
Westinghouse Electric Corp Lighting Div 1216 W
58th St (P 0 Drawer 5817) Cleveland 1 Ohio
(1-2-4-5)

Tod-Lite Inc 3401 N W 10 St Oklahoma City Okla (4)

 WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
 Center Pittsburgh 30 Pa (1 thru 5)—ADV PG
 2nd Cover Wheeler Reflector Co 275 Congress St Boston 10
Mass (2-5)
Wiley (R & W) Inc Dearborn & Bridge St Buffalo Mass (2-5)
Wiley (R & W) Inc Dearborn & Bridge St Buffalo
7 NY (4)
Woodward Machine Co Lighting Div 4833 Elmhurst Detroit 4 Mich (2)
Work-0-Lite Co 522 Cortlandt St Belleville 9
NI (2) NJ (2)

9E. PORTABLE LIGHTING EQUIPMENT

Machine & bench lights
 Extension cord & lamp
 Extension cord & lamp
 Extension cord & lamp with transformer
 Reel-type extension lamp
 Emergency lights

For portable lamps for residential use see "Residential Lighting"

Adjustable Fixture Co 104 E Mason St Milwaukee 2 Wis (1)
Arco Mfg Co 1701 13th Ave North (Box 817)
Grand Forks ND (1)
Benjamin Electric Mfg Co Northwest Highway & Seegers Rd Des Plaines III (1-2)
Benjamin Reel Products Inc 10700 Broadway Cleveland 25 Ohio (4)
Black (M) Mfg Cc 300-08 N Third St Phila 6 Pa (3)
Burton Mfg Cc 2520 Colorado Ave Santa Monica Burton Mfg Co 2520 Colorado Ave Santa Monica Calif (1) Calif (1)
Cable Electric Products Inc 234 Daboll St Providence 7 RI (5)
Carpenter Mfg Co 2250 Bradley St Somerville 45
Mass (5)
Commercial Reflector & Mfg Co 3109 Maple Ave
Los Angeles 11 Calif (3)
Compoc Corp 1800 N Spaulding Ave Chicago 41

Dynaseal Lighting Corp 5 Hadley St Cambridge 40 Mass (5) 40 Mass (5) Electric Cord Co 21 Spruce St New York 38 NY (5) Ericson Mfg Co 1660 Hayden Ave Cleveland 12 Ohlo (2-3-4) Ohio (2-3-4)
Faries Lamp Div General Lamps Mfg Corp 450 N
9th St Elwood Ind (1)
Flexo International Corp 3720 N Milwaukee Ave
Chicago 41 III (1)
Fostoria Pressed Steel Corp N Main St Fostoria
Ohio (1) Gardner Pro Mich (1) Products Co 15244 Aubrey Detroit 39 Hindle Transformer Co Inc Woods Church Rd Flem-ington NJ (3) Hoffman Engineering Corp 1050 Tyler St Anoka Minn (2) House-O-Lite Corp 2430 S Ashland Ave Chicago 7 111 (5) III (5)
Industrial Electrical Works 1509 Chicago St
Omaha 2 Neb (4)
Joy Mfg Co Electrical Products Div 1201 Macklind Ave St Louis 10 Mo (2-3)
Kliegi Bros Universal Electric Stage Lighting Co Inc
321 W 50 St NY 19 NY (5)
Koch & Lowy Mfg Co 201 E 34 St New York 16
NY (4) Koch & L NY (4)

Koehler Mfg Co 395 Lincoln St Marlboro Mass (5) Lightalarms Inc 95 Atlantic Ave Brooklyn 1 NY (5) (5) MicGill Mfg Co Inc Valparaiso Ind (2) Michigan Fluorescent Light Div 393 Orchard Lake Ave Pontiac Mich (1) Midwest Lighting Products Co P O Box 536 Edgewater Branch Cleveland 7 Ohio (1) Murray (D A) Co Inc 632 N Mill St Tipton Ind (2) Natale Machine & Tool Co 339 Highway #17 Caristadt NJ (2) Nicad Div Gould-National Batteries Inc Easthamp-ton Mass (5) Portable Light Co Inc 216 William St NY 38 NY (5)
Project Fixture Mfg Corp 55 Ongley St Rockville
Centre NY (2)
Pyle-National Co 1344 N Kastner Ave Chicago 51

Scranton Storage Battery Corp Archbald Pa (5)
Scntry-Lite & Battery Div Hobby & Brown Electronic Corp 237 Sunrise Highway Rockville
Centre NY (5)
Shalda Mfg Co Inc 156 W Providencia Ave Burbank
Calif (5) 111 (2) Standard Portable Cord Co Inc Mayville NY (1-2-5)
Stocker & Yale Inc Green St Marblehead Mass
(1-2-3)
Stonco Electric Products Co 333 Monroe Ave Kenilworth NJ (2-5)
Sun-Lite Mfg Co 2555 Bellevu Ave Detroit 7
Mich (1) 5)

Mich (1)

Swivelier Co Inc Nanuet NY (1-2)

Tod Lite Inc 3401 N W 10th 5t Oklahoma City
Okla (5)

U-C-LITE MFG CO 1050 W Hubbard St Chicago
22 III (5)—ADV PG 164

Vimco Mfg Co Inc 105 Brayton St Buffalo 13 NY
(1)

(1)
Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa (1-2)
WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1 thru 5)—ADV PG ESTINGROUSE
Center Pittsburgh 30 Pa ta
2nd Cover
Chite (0 C) Co 15-21 Hermon St Worcester 8
Al Inferson St Chicago White (0 (Mass (1) Mass (1)
Woodhead (Daniel) Co 15 N Jefferson St Chicago
6 III (2-3-4)
Woodward Machine Co Lighting Div 4833 Elmhurst Detroit 4 Mich (1)

9F. GASEOUS DISCHARGE LAMPS

1. Arc
2. Cold cathode
3. Fluorescent
4. Mercury vapor
5. Sodium vapor

Light sources only; fixtures are listed under "Portable Lamps" and "Residential Lighting".

Amplex Corp 111 Water St Brooklyn 1 NY (3-4) Celine Inc North Island Ave Batavia III (2) Champion Lamp Works 330 Lynnway Lynn Mass

Champion Lamp Works 330 Lynnway Lynn Mass (3)
Cold Cathode Lighting Corp 42-40 27th St Long Island City NY (2)
Cooper Hewitt Electric Co 720-732 Grand St Hoboken NJ (3-4)
Duro-Test Corp 2321 Hudson Bivd North Bergen NJ (2-3-4)
GENERAL ELECTRIC CO LAMP DIV LARGE LAMP DEPT Nela Park Cieveland Ohio (3-4)—ADV PG 122
GRAYBAR ELECTRIC CO INC 420 Lexington Ave Ny 17 NY (3)—ADV PG 2-162
Great Western Div Interlectric Corp 1401 Lexing-ton Ave Warren Pa (3)
Illuminating Engineering Co 2347 East Nine Mila Rd Hazel Park Mich (2)
Luxor Lighting Products Inc 350 5th Ave New York 1 NY (2-3-4)
Marvel Lamp Co 307 Newark St Hoboken NJ (3)
National Cathode Corp 5 University PI New York 3 NY (2)

Penetray Corp 615 Front St Toledo 5 Ohio (3-4) Pollak Luminescent Corp 732 S Federal St Chi-cago 5 III (2) Radiant Lamp Corp 300 Jelliff Ave Newark 8 NJ (4)

Solar Electric Corp 121 Central Ave Warren Pa (3) Supro Lux Mfg Co Inc 406-416 E 161 St New York 51 NY (2-3) Swedish Iron & Steel Corp 910 Westfield Ave Elizabeth NJ (2)

Sylvania Electric Products Inc 1740 Broadway NY 19 NY (1-2-3) NY 19 NY (1-2-3)
Westinghouse Electric Corp Lamp Div Bloomfield
NJ (1-2-3-4-5)

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1 thru 5—ADV PG

9G. FILAMENT LAMPS

1. Clear or frosted
2. Colored
3. Glow (neon & argon)
4. Infrared
6. Ultra-violet
6. Insect repellent
7. Ministure
8. Reflector flood & PAR
9. Sealed beam
10. Decorative

Light sources only; fixtures are listed under "Portable Lamps" and "Residential Light-

Aerolux Lights Corp 653 11th Ave New York 36 NY (3) nplex Corp 111 Water St Brooklyn 1 NY (1-2-4-6-8-9) Champion Lamp Works 330 Lynnway Lynn Mass (1-2-4-6-8-10) Chicago Miniature Lamp Works 1500 N Ogden Ave Chicago 10 III (1-2-3-7-9) Cold Cathode Lighting Corp 42-40 27th St Leng Island City NY (5) Dialight Corp 60 Stewart St Brooklyn 37 NY (3-7)

Dialight Corp 60 Stewart St Brooklyn 37 NY (3-7)
Duro-Test Corp 2321 Hudson Blvd North Bergen NJ (1-2-4-6-8)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza South Long Island City 1 NY (4)
Elite Glass Co Inc 111 W 22nd St New York 11 NY (1)
General Electric Co Lamp Dlv Large Lamp Dept Nela Park Cleveland Ohio (1 thru 10)
General Electric Co Lamp Dlv Miniature Lamp Dept Nela Park Cleveland Ohio (7)
GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY 17 NY (1-2-1-ADV PG 2-162
Great Western Div Interlectric Corp 1401 Lexington Ave Warren Pa (1-6-8)
Hudson Lamp Co 528 Elm St Kearny NJ (3-7)
Luxor Lighting Products Inc 350 5th Ave New York 1 NY (1-2-4-6-7-8-9)
Marco Industries 207 S Helena St Anahelm Calif (3-7)
Marvel Lamp Co 307 Newark St Hoboken NJ

Callf (3-7)
Marvel Lamp Co 307 Newark St Hoboken NJ
(1-4-6-8)
Natale Machine & Tool Co 339 Highway #17
Carlstadt NJ (1-2-4-8)
NORTH AMERICAN ELECTRIC LAMP CO 1520
North 13th St St Louis 6 Mo (2-4-7-10)—ADV
PG 158
Northern Incandescent Lamp Co 1 Newark St
Hoboken NJ (1-2-4-6)
Penetray Corp 615 Front St Toledo 5 Ohio
(1-2-4-5-6-8)
Pyrosil Inc 1889 Front St Cuyahoga Falls Ohio Pyrosil Inc 1889 Front St Cuyahoga Falls Ohio Radiant Lamp Corp 300 Jelliff Ave Newark 8 NJ (1-2-4-8-9) Signalite Inc 37-41 Neptune Highway Neptune NJ (3) Solar Electric Corp 121 Central Ave Warren Pa (1-2-4-6) Pa (1-2-4-6)
Star-A Electric Mfg Co Inc 269 Meserole St
Brooklyn 6 NY (1-6-8)
Sylvania Electric Products Inc 1740 Broadway
NY 19 NY (1-2-3-4-7-8)
Ultra-Violet Products Inc 5114 Walnut Grove Ave
San Gabriel Calif (5)
Westinghouse Electric Corp Lamp Div Bloomfield
NJ (1 thru 9)

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1-2)—ADV PG 2nd
Cower

9H LIGHTING FIXTURE REFLECTORS & LOUVERS

For use with suitable sockets or fixtures or for area and ceiling lighting systems.

Abolite Lighting Dlv Jones Metal Products Co West Lafayette Ohio Abrams Lighting 3432 Market St Philadelphia 4 Acme Lighting & Mfg Co 949 E 31 St Los Angeles 11 Calif Adalet Mfg Co 14300 Lorain Ave Cleveland 11 Afco Lite Corp 1234 N Paulina St Chicago 22

All-Brite Light Co 400 S 12 St Reading Pa AMERICAN LOUVER CO 4240 N Sayre Ave Chi-cago 34 III—ADV PG 125 Appleton Electric Co 1701-59 Wellington Ave Chi-cago 13 III Artcraft Lighting Co Inc 248 McKibben St Brook-

Artcraft Lighting Co Inc 200 monitors.

Artcraft Lighting Co Inc 200 Walker St St Louis Park Minneapolis 16 Minn
Benjamin Electric Mfg Co Northwest Highway & Seegers Rd Des Plaines III

CANNING-PEKARA INC 2144 N Wood St Chicago 14 III—ADV PG 147
Capitol Stage Lighting Co Inc 527 W 45 St New York 36 NY
Cold Cathode Lighting Corp 42-40 27th St Long Island City NY
Cole (C W) & Co Inc P 0 Box 3382 Los Angeles Island City NY
Cole (C W) & Co Inc P 0 Box 3382 Los Angeles 54 Calif Columbia Electric & Mfg Co North 2310 Fancher Way Spokane Wash Compco Corp 1800 N Spaulding Ave Chicago 47 111 mlite Fluorescent Co 7 Roselle St Mineola Curtis Lighting Inc 6135 W 65 St Chicago 38 III

Cutler Light Mfg Co 2026 N 22 St Phila 21 Pa

Derrick Light & Equipment Co 1201 E Daggett

(P 0 Box 414) Fort Worth Tex.

Eagle Electric Mfg Co Inc 23-10 Bridge Piaza

South Long Island City 1 NY

Electro Silv-A-King Corp 1535 South Paulina St

Chicaso B III Chicago 8 III Elite Glass Co Inc 111 W 22nd St New York 11 NY
Eric Glass Mfg Co 564 Union Trust Bidg Pittsburgh 19 Pa
Frink Corp 27-01 Bridge Plaza North LIC NY
General Lighting Co 248 McKibbin St Brooklyn 5 NY Great Northern Mfg Corp 1056 N Wood St Chicago 22 III Gruber Bros Inc 125 South First St Brooklyn 11

OGUTH (EDWIN F) CO 2615 Washington Blvd St Louis 3 Mo—ADV PG 111 Hexcel Products Inc 2741 Ninth St Berkeley 10 Holophane Co Inc 342 Madison Ave New York 17 House-O-Lite Corp 2430 S Ashland Ave Chicago 7

Ideal-Simplet Fittings Inc 5136 Park Ave Sycamore III

JACKSON ELECTRICAL CO 900 W Van Buren St Chicago 7 III—ADV PG 156 K-B Lighting Mfg Co 2101 Byberry Rd Phila 16 Keystone Electric Mfg Co 2228 E Tioga St Phila A Page 134 Page 145 P

Kurtzon (Morris) inc 1420 Statman Ave Cincago 8 III
Lancaster Glass Corp Lancaster Ohio
Light & Power Utilities Corp 1035 Firestone Blwd
Memphis 7 Tenn
Line Material Industries McGraw-Edison Co 700
W Michigan St Milwaukee Wis
McKee Div Thatcher Glass Mfg Co Inc Jeannette

McKee Div Thatcher Glass mrg of the Spanish McKee Div Thatcher Glass mrg of the Spanish McKee Divided McKee Divided McKee Divided McKee Chandelier Co 15th & Gentry (P O Box 7365) North Kansas City 16 Mo Midwest Lighting Products Co P O Box 536 Edgewater Branch Cleveland 7 Ohlo Miller Co Illuminating Div 99 Center St Meriden Chan

MiroFlector Co Inc 40 Bayview Ave Inwood LI

MV Light Co Inc 7809 Maplewood Industrial Court St Louis 17 Mo MULTI ELECTRIC MFG INC 4223 W Lake St Chicago 24 III—ADV PG 144
National Cathode Corp 5 University P! New York 3 NY American MFG Co. 411 S Clinton St Chic 3 NY
Overbagh & Ayres Mfg Co 411 S Clinton St Chlcago 7 III
Pittsburgh Reflector Co Oliver Bidg Mellon Square
Pittsburgh 22 Pa
Quadrangle Mfg Co 32 S Peoria St Chicago 7 Rab Electric Mfg Co Inc 605 E 132 St New York 54 NY Ruby-Philite Corp 32-02 Queens Blvd L I C 1 NY Russell & Stoll Co Inc 125 Barclay St. NY 7 NY Spero Electric Corp 20500 St Clair Ave Cleveland 17 Ohio Stabrite Fluorescent Mfg Co 3550 Northwest 49 St Mami Fla Standard Portable Cord Co Inc Mayville NY Steber Mfg Co 2700 Roosevelt Rd Broadview

Steber Mfg Co 2700 Roosevelt Md Broadview III
Swivelier Co Inc Nanuet NY
Versen (Kurt) Co 4 Slocum Ave Englewood NJ
Westinghouse Electric Corp Lightling Div 1216 W
58th St (P 0 Drawer 5817) Cleveland 1 Ohio
WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa—ADV PG 2nd Cover
Yorkville Metal Products Co 677 Broadway NY 12

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

*Code	Description, Pages Catalog No. & Mfr.	
9-1	Lighting Equipment; 72p; Cat. No. (Garden City)	0.

- 9.2 Engineered Lighting; 112p (Fullerton)
- Better Lighting for Better Living; 34p (Federal Lighting) 9-3

L-110

- Lighting Fixture Catalog & Buyers Guide; 252p; Cat. No. 60-C-6 (Day-Brite) 9.4
- Commercial & Industrial Lighting Equipment; 144p; Cat. No. PBC-258 (Miller) 9-5
- Industrial Incandescent, Mercury & Vapor-Tight Luminaires; 38p (Miller)
- Emergency Lighting Systems; 20p; Cat. No. 243-A (Standard Electric) 9-7
- Vaporproof & Weatherproof Lighting; 28p; Cat. No. 58 (Rab) 9.8
- Contemporary Church & Public Building Light-ing; 16p; Cat. No. C (Manning)
- Traditional Church & Institutional Lighting; 22p; Cat. No. T (Manning)
- 9-11 Indicator Lights; 56p (Marco)
- Lighting Equipment; 42p; Cat. No. L-1 (Shalda) 9-12
- Specialized Industrial & Commercial Lighting Equipment 24p; Cat. No. C-1 (Shalda) 9-13
- Lighting Equipment; 52p (Spero)

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- Contemporary Lamps & Fixtures; 23p (Koch)
- 9-16 Home Lighting; 16p; Cat. No. 101 (Ace)
- New Forms in Linear Lighting; 12p; Cat. No. 54 (Artcraft) 9-17
- 9-18 Church Lighting Fixtures; 16p; Cat. No. 52
- 9-19 All-Aluminum Lighting Standards; 16p; Cat. No. ALS (Pfaff)

- 9-20 Lighting Equipment; 20p; Cat. No. 57 (Atlas)
- Lighting for Streets, Highways & Bridges; 12p; Cat. No. OTA (Millerbernd)
- 9-22 Lighting; 34p (MiroFlector)
- Lighting Equipment; 32p; Cat. No. 117A (Overbagh) 9-23
- 9-24 Portable Lighting; 12p; Cat. No. B-52a (Joy)
- 9-25 Vapor-Tight Light Fixtures; 48p; Cat. No. 12
- Fluorescent Lighting Fixtures; 90p; Cat. No. 210 (House-O-Lite) 9-26
- Architectural Troffers; 36p; Cat. No. C-430 9-27
- 9-28 Exterior Lighting; 14p; Cat. No. 5 (Stern-
- Incandescent Lighting Fixtures; 36p; Cat. No. G-11 (Prescolite) 9-29
- Floodlighting; 24p; Cat. No. 9A (Quadrangle)
- Industrial Lighting Reflectors; 24p; Cat. No. 10A (Quadrangle) 9-31
- Lighting Equipment (Specification Data; 64p (Crownlite)
- 9-33 Lighting for Drilling Equipment; 34p (Derrick)
- Lighting & Control Equipment for the Mod-ern Stage; 12p; Cat. No. SL-56 (Hub)
- Industrial Reels & Collector Rings; 42p (Industrial Electric) 9-35
- 9-36 Fluorescent & Slimline Fixtures; 28p; Cat. No. 16 (Quaker City)
- 9-37 Commercial Lighting Application Guide; 20p; Cat. No. L-100 (Corning)
- 9-38 Stage Lighting Apparatus; 88p; Cat. No. 25
- 9-39 Incandescent & Fluorescent Lighting; 175p; Cat. No. PLL (Pittsburgh Reflector)
- Glow Lamps & Circuit Control Components; 8p; Cat. No. 3-6177 (G-E) 9-40
- Commercial & Industrial Lighting; 20p; Cat. No. PL61-020 (Westinghouse)
- 9-42 Floodlighting; 12p; Cat. No. PL61-320 (West-
- 9-43 Mercury Vapor Floodlighting; 18p; Cat. No. 640 (Pyle-National)
- 9-44 Lighting Maintenance Manual; 48p (Cham-
- 9-45 Lighting Datalog; 64p (Holophane)

- 9-46 Lighting for Industry; 112p (Holophane)
- 9-47 Lighting Fixtures; 28p; Cat. No. 13 (Frisbie)
- 9-48 Lighting Equipment Data; 80p (Kent)
- Modernized Lighting; 64p; Cat. No. FB-2 (K-B)
- 9-50 Adjustable Lighting Units; 38p; Cat. No. 132 (Swivelier)
- 9-51 Street Lighting & Tubular Steel Products; 16p; Cat. No. SL (Eireco)
- 9-52 Architectural Lighting; 35p; Cat. No. A-11 (Kliegi)
- Theatrical Lighting; 84p; Cat. No. T-61 9-53
- 9-54 Television Lighting; 27p; Cat. No. TU-S (Kliegi)
- 9-55 Stage Lighting in the School Theater; 16p (Kliegl)
- History of Stage Lighting; 12p (Kliegi)
- 9-57 Fluorescent Lighting Fixtures; 40p (Felco)

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the Electrical Products Guide" when ordering. Prices are subject to change.

Illuminating Engineering Society, 1860 Broadway, New York 23, N. Y.:
Contemporary Lighting in Modern and Traditional Interiors, 58p. Price: \$1.00
Protective Lighting, 20p. (RP-10) Price: 50¢
Industrial Lighting, 40p. (RP-7) Price: 50¢
Street: & Highway Lighting, 32p. (RP-8) Price: 50¢
School Lighting, 80p. (RP-3) Price: 50¢
Supplementary Lighting, 16p. (RP-9) Price: 50¢
Daylighting, 40p. (RP-6) Price: 50¢
Office Lighting, 32p. (RP-4) Price: 50¢
Sports Lighting, 32p. (RP-4) Price: 50¢
Stores & Other Merchandising Areas, 104p. (RP-2)
Price: 50¢ Price: 50€

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price: \$1.50

SECTION 10. SIGNAL, COMMUNICATING & INDICATING EQUIPMENT

Many of the indicating devices listed below are closely related to industrial processing controls listed in Section 3.

10A. METERS & TESTERS

- METERS & TESTERS

 Ammeters, voltmeters, & volt-ammeters
 Circuit analyzers
 Protective device analyzers
 Demand meters
 Fluxmeters
 Gaivanomatere
 Kilowatt-hour meters
 Ohnmeters & insulation testers
 Potentiometers
 Potentiometers
 Tochometers
 Varmeters
 Wattmeters
 Phase angle meters
 Bridges
 Frequency meters
 Stroboscopes
 Oscilloscopes
 Magnetos

- 22. Meter testers
 23. Ground detectors
 24. Continuity testers
 25. Electrostatic meters
 26. Fluorescent unit testers
 27. Turns-ratio testers

Arms First Alarm Company Inc 106 Seventh Ave New York 11 NY (23)
Aero Instrument Co 11423 Vanowen 5t North Hollywood Calif (16)
Airserco Mig Co Inc 435 Melwood St Pittsburgh 13 Pa (1-2)
Alien Electric and Equipment Co 2101-2117 N Pitcher St Kalamazoo Mich (1-11-21)
Anchor Mig Co P O Box 959 Manchester NH (22)
Assembly Products Inc Chetserland 31 Ohio (1)
Associated Research Inc 3777 W Belmont Ave Chicago 18 III (8)
Auth Electric Co Inc 34-20 45th St L I C 1

Associated Research Inc 3/1/ W Belmont Ave Chicago I & III (8) Auth Electric Co Inc 34-20 45th St L I C 1 NY (23) Beede Electrical Instrument Co Inc Penacook NH (I-6-8-13)

Bergen Laboratories 247 Crooks Ave Cliften NJ (1-8)

(1-8)
Berkshire Laboratories 942 Bank Village Greenville NH (17)
Blddle (James G) Co 1316 Arch St Phila 7 Pa
(2-6-8-11-16-23-27)
Bogue Electric Mfg Co 52 Iowa Ave Paterson 3
NJ (2)
Borden Engineering Div M J Johnsen Aircraft
Engineering Co Box 10 Morristown NJ (2-68-23)

Bright Star Industries 600 Getty Av Clifton NJ (24)

(24)
Burton-Rogers Co 42 Carleton St Cambridge 42
Mass (1-6)
Cannon Electric Co 3208 Humboldt St Los Angeles 31 Calif (23)
COLUMBIA ELECTRIC MFG CO 4519 Hamilton Ave Cleveland 14 Ohio (1)—ADV PG 152
Crown Industrial Products Co 713 Amsterdam St Woodstock III (20)
Davenport Mfg Co 1713 N Ashland Ave Chicago 22 III (1-2-8)
Davis Electric Co 28 Parker St Wallingferd Conn (8)

Davis Electric Co 28 Parker St Wallingfard
Conn (8)

Electric Tachometer Corp 68th & Upland Sts Phila 42 Pa (11) Electro Devices Inc 116 S Michigan Ave Chicago 3

Electro-Mechanical Instrument Co 8th & Chestnut Sts Perkasie Pa (1) Epos Electronics Inc 140 Liberty St New York 6 NY (8)

Erwood Inc 1770 Berteau Ave Chicago 13 III (2)
Easterline-Angus Co Inc P O Box 596 Indianapolis
6 Ind (1-10-11-12-13-16)
Excel Electric Service Co Inc 2113 S Western Ave
Chicago 8 III (23)
Fisher Research Laboratory Inc 1961 University
Ave Palo Alto Calif (1)
Fleron (M M) & Son 1220 Yardley Rd Morrisville
Pa (8)

Pa (8) al Controls Co 801 Allen Ave Glendale Calif Ger

(9) Scheneral Electric Co Apparatus Sales Div Schenectady 5 NY (1-2 thru 13-20) General Radio Co 275 Massachusetts Ave Cambridge 39 Mass (8-11-15-17) Gray Instrument Co 200 E Church Lane Phila 44 Pa (8-9) SECTRIC ON UNC

Pa (8-9)
GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NV (1)—ADV PG 2
Greibach Instruments Corp Metuchen NJ (1-8)
Hewson Co Inc 443 Broad St Newark 2 NJ (1-8)
Hickols Electrical Instrument Co 10514 Dupont Ave and 8 Ohio (1-2-4-5-6-8-10-12-13-14-16-17-18-20)

oltzer-Cabot Div National Pneumatic Co Inc 125 Amory St Boston 19 Mass (8) Amory St Boston 19 Mass (8)
Hughes Products Hughes Aircraft Co International
Airport Station Los Angeles 45 Calif (18)
Hughes Products Hughes Aircraft Co Los Angeles
45 Calif (18)

IDEAL INDUSTRIES INC 5136 Park Ave Sycamore
III (2-8-11)—ADV PG 124
Industrial Development Labs Inc 17 Pollock Ave
Jersey City 5 NJ (15)
Industrial Devices Inc Edgewater 19 NJ (1)
Industrial Instruments Inc 89 Commerce Rd Cedar
Grove NJ (2-8)

Instrument Laboratories 315 W Walton Pl Chicago 10 III (2-23) Jackson Electrical Instrument Co 18 S Patterson Blvd Dayton 2 Ohio (2-18)
Jones Motrola Corp 432 Fairfield Ave Stamford

Conn (11)
Kay Electric Co Maple Ave Pine Brook Kellogg Switchboard and Supply Co 79 W Monroe St Chicago 3 III (1-8) Kin Tel 5725 Kearney Villa Rd San Diego 12

Calif (1-6)
Knopp Inc 1307 66th St Oakland 8 Calif (25)
Leeds & Northrup Co 4970 Stenton Ave Phila 44
Pa (6-8-9-14-15)

Letitch Engineering Corp Commercial at Stark St Manchester NH (1) Lewis Engineering Co 52 Rubber Ave Naugatuck Conn (9)

Conn (9)
Manning Maxwell & Moore Inc 250 E Main St
Stratford Conn (1)
Marion Electrical Instrument Co Grenier Field
Manchester NH (1-22)
Martindale Electric Co 1383 Hird Ave Cleveland 7 1383 Hird Ave Cleveland 7 artindale Electric Co 138 Ohio (1-2-8-10-11-13-21) ters Inc 5353 N Keystone Ave Indianapolis 20 Ind (1-2-8)

strument Co 432 Lincoln St Denver 3 Colo (11)

Minneapolis-Honeywell Regulator Co 2753 Fourth
Ave S Minneapolis B Minn (9)
Minneapolis-Honeywell Regulator Co Boston Div 40
Life St Boston 35 Mass (6)
Multi-Amp Corp 465 Lehigh Ave Union NJ (3-

8-22) nkervis (Geo L) Co 15300 Fullerton Ave Detroit 27 Mich (20) elson Electric Mfg Co P O Box 5385 Tulsa Okla (2-3-23)

Electronics Inc RFD #1 Patterson NY (2-8) Potter & Rayfield Inc P 0 Box 1042 Atlanta Ga (20-21)

Pyramid Instrument Corp 630 Merrick Rd Lynbrook NY (1) Frequency Laboratories Inc Boonton NJ

Rattray (George) & Co 116-08 Myrtle Ave Richmond Hills 18 NY (9)

Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa

Russell & Stoll Co Inc 125 Barclay St NY 7 NY (23) NY (23)
Ingamo Electric Co 11th & Converse Springfield
III (1-4-7-10-12-13)

Albina Ava Rossmovne chauer Mfg Corp 4500 Alpine Ave Rossmoyne Ohio (21)

Sensitive Research Instrument Corp 310 Main St New Rochelle NY (1-5-6-13) Shallcross Mfg Co Preston St Selma NC (2-6-8-9-15)

Shurite Meters 35 Hamilton St New Haven 8 Conn (1)

Simpson Electric Co 5200 W Kinzle St Chicago 44 III (1-2-6-8-13-18) Sittler Corp 18 N Ada St Chicago 7 111 (2) Slaughter Co College & Young Sts Piqua 5 Ohio
(8-17)

on-Tools Corp 8028 28th Ave Kenosha Wis (1-11-21)

Southwestern Industrial Electronics Co 2831 Post
Oak Rd (P O Box 13058) Houston 19 Tex (1-6-8-11-15-18)

Speedex Mfg Co .418 S Wyman St Rockford III Standard Electric Time Co 89 Logan St Spring-field 2 Mass (11-20) States Co 19 New Park Ave Hartford 6 Conn (22)

Sticht (Herman H) Co Inc 27 Park Place New York 7 NY (1-2-8-11-15-16-17)

Tektronix Inc P O Box 831 Portland 7 Ore (18) Trio Laboratories Inc 4025 Merrick Road Seaford NY (1-14)

rr (12-14)

Fiplett Electrical Instrument Co 286 Harmon Rd
Bluffton Ohio (1-2-8-13-18)

S Gauge Div American Machine & Metals Inc
Clymer Ave Sellersville Pa (1)

Vac Line Inc. 28 S St Clair St Davion 2 Ohio 35 S St Clair St Dayton 2 Ohio (1-11-16-23-25)

(1-11-16-23-25)
Waterman Products Co Inc 2445-63 Emerald St
Phila 25 Pa (18)
Waveland Electric Co 5542 N Ashland Ave Chicago 40 III (2-21)

Vestern Electro-Mechanical Co Inc 300 Broadway
Oakland 7 Calif (1-10-14)
Westinghouse Electric Corp P O Box 868 Pittsburgh
30 Pa (1-2-4-7 thru 14-16-23) 30 Pa (1-2-4-7 thru 14-16-23) ●WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway

Center Pittsburgh 30 Pa (1-2-4)—ADV PG 2nd Cover Weston Instruments Div of Daystrom Inc 614 Frelinghuysen Ave Newark 5 NJ (1-2-5-6-8-10-11-13) Zernickow (0) Co 15 Park Row NY 38 NY (11)

10B. INDICATORS & ALARMS

Annunciators & systems Bin level Blown fuse

3. Blown fuse
4. Revolution counters
5. Current failure
6. Fault & ground
7. Photoelectric
8. Liquid level
9. Peak load
10. Phase sequence
11. Smoke
12. Synchroscopes
13. Temperature
14. Lamp failure

For associated controls, see "Controls & Control Switches" in Section 3.

Acme Fire Alarm Company Inc 106 Seventh Ave New York 11 NY (1)
coustica Associates Inc 26 Windsor Ave Mineola
NY (8) Electric Co 954 Frankford Ave Phila 23 Pa

Alden Products Co 117 N Main St Brockton Mass (3)

(3)
Allen-Bradley Co 136 W Greenfield Ave Milwaukee
4 Wis (5)
American Sentry Inc 84 Bethlehem Pike Philadelphia 18 Pa (7-11-13)
Assembly Products Inc Chesterland 31 Ohio (13)
Associated Research Inc 3777 W Belmont Ave Chicago 18 III (10)

Auth Electric Co Inc 34-20 45th St LIC1 NY (1) Autocali Co 58 Warden Ave Shelby Ohio (1) Automatic Control Co 995 University Ave St Paul 4 Minn (1-2-5-8-13) Automatic Devices Co Inc 714 Hillgrove Ave Western Springs III (13) Automation Products Inc 3030 Max Roy St Houston 24 Tex 60

Automation Products Inc. 3030 Max Roy St. Houston 24 Tex. (8) B/W Controller Corp. 2200 E Maple Rd Birming-ham Mich (7-8) Bailey Meter Co. 1050 Ivanhoe Rd. Cleveland 10 Ohio (8-11-13)

Biddle (James G) Co 1316 Arch St Phila 7 Pa Bin-Dicator Co 13946 Kercheval Ave Detroit 15 Mich (2) Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ (8-13)

NJ (8-13)
Borden Engineering Div M J Johnson Aircraft Engineering Co Box 10 Morristown NJ (6)
Brunswick Instruments P O Box 813 New Bruns-

NJ (10)
Instrument Co Inc 16 River Rd Chatham NJ (13)

NJ (13)
Cannon Electric Co 3208 Humboldt St Los Angeles
31 Calif (1)
Central Station Signals Inc 53 W 23 St New York
10 NY (5-8-11-13)
.onvair Inc P 0 Box 9671 Pittsburgh 16 Pa (2)
Couch (S H) Co Inc 3 Arlington St North Quincy
71 Mass (1)

71 Mass (1)
Counter & Control Corp 5225 W Electric Ave
Milwaukes 19 Wisc (4)
Crouse-Hinds Co Syracuse 1 NY (6-8)
Davenport Mfg Co 1713 N Ashland Ave Chicago
22 111 (6-10)

DeJur-Amsco Corp 4501 Northern Blvd Long Island City 1 NY (13) City 1 NY (13)
Dietz (Henry G) Co Inc 12-16 Astoria Blvd Long
Island City 2 NY (7-8)
Dwyer (F W) Mfg Co Woodland at Greenwood (P O
Box 373) Michigan City Ind (8)
Eastern Specialty Co 3617 N 8th St Phila 40 Pa
(10)

Edwards Co Inc Norwalk Conn (1) Electric Machinery Mfg Co 800 Central Ave Min-neapolis 13 Minn (12)

ometer Corp 68th & Upland Sts Phila Pa (4) Electro Devices Inc 116 S Michigan Ave Chicago Electro-Mechanical Instrument Co 8th & Chestnut Sts Perkasie Pa (5) Electronic Control Corp 1573 E Forest Ave Detroit Mich (7-11)

7 Mich (7-11) Elimann Engineering Co 3320 M St N W Wash-ington 7 DC (1-6-11-13) Fischer & Porter Co 335 Warminster Rd Hatboro Pa (8)

Pa (8)
Fisher Research Laboratory Inc 1961 University
Ave Palo Aito Calif (8)
General Controls Co 801 Allen Ave Glendale Calif General Electric Co Apparatus Sales Div Schenec-tady 5 NY (4 thru 13) Gray Instrument Co 200 E Church Lane Phila 44 Pa (13)

Pa (13)
Hankscraft Co Control Div Reedsburg Wis (9)
Healy-Ruff Co Water Level Controls Div 2255 University Ave St Paul 14 Minn (8)
Heal-Timer Corp 657 Broadway New York 12 NY

Heat-1. (13) Hewitt-Robins Inc 666 Glenbrook Rd Stamford Hewitt-Robins Inc 666 Gienorook Rd Saminor Conn (22) Hewson Co Inc 443 Broad St Newark 2 NJ (6) Hickok Electrical Instrument Co 10514 Dupont Ave Cleveland 8 Ohio (13) Hope Electrical Products Co Inc 27 Long Ave Hill-

NJ (8) Hughey & Phillips Inc 3200 North San Fernando Blvd Burbank Calif (14) Illinois Testing Laboratories Inc 420 N LaSalle St Chicago 10 Ill (13) 3200 North San Fernando Tillinois Testing Ladoratories in 1920 in Laudine 31 Chicago 10 III (13)
Industrial Development Labs Inc 17 Pollock Awa Jersey (Ety 5 NJ (7)
Industrial Devices Inc Edgewater 19 NJ (3)
Industrial Instruments Inc 89 Commerce Rd Cedar Grove NJ (2)

**Growth MG Co. 932 NJ 4 St. Columbus 16. Obio (2)

Grove NJ (2)
Jeffrey Mfg Co 832 N 4 St Columbus 1.6 Ohlo (2)
Jordan Co Inc 3235 West Hampton Ave Milwaukee
9 Wls (7)
Kirkland (H R) Co 8 King St Morristown New
Jersey (1)

Knopp Inc 1307 66th St Oakland 8 Calif (10) Kurman Electric Co 191-193 Newel St Brooklyn 22 NY (7)
Larson Instrument Co 24 Orchard St Tarrytown NY (5-13) Leeds & Northrup Co 4970 Stenton Ave Phila 44

Pa (6-11-13) Magnetrol Inc 2110 S Marshall Blvd Chicago 23 III (7-8) Manning Maxwell & Moore Inc 250 E Main St Stratford Conn (8-13) Marsh (Jas P) Corp 3501 Howard St Skokie III

(13)

McDonnell & Miller Inc 3500 N Spaulding Ave Chicago 18 III (7-8)
Mchanical Industries Production Co 217-223 Ash St Akron 9 Ohio (13)
Mercold Corp 4201 W Belmont Ave Chicago 41
III (13)

III (13)
Minneapolis-Honeywell Regulator Co 2753 Fourth
Ave S Minneapolis 8 Minn (4)
Minneapolis-Honeywell Regulator Co Industrial Div
Wayne & Windrim Aves Phila 44 Pa (7-8-13)
Nelson Electric Mfg Co P 0 Box 5385 Tulsa Okla (1-5-6)

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Peschel Electronics Inc RFD #1 Patterson NY (4-5-6) Pa (1) Photobell Co Inc 43 Vesey St New York 7 NY

(8.11) Post Machinery Co Electronic Products Div 140 Elliott St Beverly Mass (7) Pyrometer Instrument Co Bergenfield NJ (13) Russell & Stoll Co Inc 125 Barclay St NY 7 .NY

Scam Instrument Corp 1811 W Irving Pk Rd Chi-cago 13 III (1) Scott (Hermon Hosmer) Inc 111 Powder Mill Rd Maynard Mass (15)

Scrayco Mfg Co 201 Greene Ave Middlesex NJ (2)

Sell (H H) Electric Co 3240 Dakota Ave Minne-apolis 16 Minn (10) Shallcross Mfg Co Preston St Selma NC (6) Simmonds Accessories Inc Tarrytown New York (8) Sperti Faraday Inc 1322 E Church St Adrian Mich (1)

Standard Electric Time Co 89 Logan St Springfield 2 Mass (1-4) Sticht (Herman H) Co Inc 27 Park Pl New York 7 NY (10) Superior Interlock Corp 73-39 Central Ave Glen-dale 27 NY (1)

Tigerman Engineering Co 4332 N Western Ave Chicago 18 111 (1) Trimount Instrument Co 3119 W Lake St Chicago

United Mfg Co 41 Haig St Hamden 14 Conn (10) U S Gauge Div American Machine & Metals Inc Clymer Ave Sellersville Pa (13) Veeder-Root Inc 70 Sargeant St Hartford 2 Conn

Viking Instruments Inc East Haddam Conn (1-8-13) Walkirt Co 141 W Hazel St Inglewood 3 Calif

Wallace & Tierman Inc 25 Main St Belleville NJ (7-8) (7-8)
Warrick (Chas F) Co 1964 W Eleven Mile Rd
Berkley Mich (8)
Weksler Instrument Corp 195 E Merrick Rd Freeport LI NY (13)
West Instrument Corp 4363 W Montrose Ave Chlcago 41 III (13) cago 41 III (13)
Western Electro-Mechanical Co Inc 300 Broadway
Oakland 7 Calif (10)
Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa (8)
Weston Instruments Div of Daystrom Inc 614
Frelinghuysen Ave Newark 5 NJ (13)
White-Rodgers Co 1209 Cass Ave St Louis 6 Mo
(13) Worner Electronic Devices Rankin III (11)

10C. FIRE ALARM SYSTEMS

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Inc

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1. Residential 2. Commercial & industrial

Acme Fire Alarm Company Inc 106 Seventh Ave New York 11 NY (2) American Sentry Inc 84 Bethlehem Pike Phila-delphia 18 Pa (2) Auth Electric Co Inc 34-20 45th St L I C 1 NY (1-2) Auth Electric Co Inc 34-20 45th St L I C 1 NY (1-2)
Autocall Co 58 Warden Ave Shelby Ohio (2)
Automatic Control Co 995 University Ave St Paul
4 Minn (2)
Central Station Signals Inc 53 W 23 St New York
10 NY (2)
COUCH (S N) CO INC 3 Arlington St North Quincy
71 Mass (2)—ADV PG 134
Edwards Co Inc Norwalk Conn (1-2)
Ellmann Engineering Co 3320 M St NW Washington 7 DC (2)
Federal Sign & Signal Corp 8726 S State St Chlcago 19 III (2)
Fire Alarm Thermostat Corp 53 W 23 St New
York 10 NY (1-2)
Gamewell Co Newton Upper Falls 64 Mass (2)
Industrial Automation Corp 2415 W Montrose Ave
Chicago III (1-2)
International Business Machines Corp Times Equipment Div 590 Madison Ave New York 22 NY
(2) Kidde (Walter) & Co Inc 459 Main St Belleville 9 Kidde (Watter) & Go and Advisor Co Ave S Minneapolis 8 Minn (1)
Ave S Minneapolis 8 Minn (1)
Autonal Time & Signal Corp 21800 Wyoming Ave Detroit 37 Mich (2)
New Jersey Fire Alarm Co 37 S 8th St Newark 2 N.1 (2) Partrick & Wilkins Co 51 N Seventh St Phila 6 Pa (2) Reeve Electrical Co Inc 120 W 42nd St New York 36 NY (2) Russell & Stoll Co Inc 125 Barclay St N Y 7 NY (2) NY (27)
SAFA Alarm Div Inc
Newark NJ (2)
Sperti Faraday Inc
Mich (2)

1322 E Church St Adrian Mich (2)
Standard Electric Time Co 89 Logan St Springfield
2 Mass (2)
Stromberg Time Corp 135 S Main St Thomaston

2 Mass (2)
Stromberg Time Corp 135 5 Main
Conn (2)

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway
Center Pittsburgh 30 Pa (1-2)—ADV PG 2nd

OWHEELOCK SIGNALS INC Branchport Ave Long Branch NJ (2)—ADV PG 172 Worner Electronic Devices Rankin III (1-2)

10D. INTRUSION ALARM & PROTECTIVE SYSTEMS

Residential Commercial & industrial Fence & boundary

Auth Electric Co Inc 34-20 45th St L I C 1 NY (1-2)
American Sentry Inc 84 Bethlehem Pike Philadelphia 18 Pa (2)
Autocall Co 58 Warden Ave Shelby Ohio (2)
Central Station Signals Inc 53 W 23 St New York
10 NY (1-2-3)
Edwards Co Inc Norwalk Conn (1-2)
Industrial Automation Corp 2415 W Montrose Ave
Chicago III (1-2)
Chicago III (1-2) Linicago III (1-2)
Kidde (Walter) & Co Inc 459 Main St Belleville
9 NJ (1-2-3)
Partrick & Wilkins Co 51 N Seventh St Phila 6
Pa (1-2-3)
Photobell Co Inc 43 Vesey St New York 7 NY
(1-2-3)
Recora Co Inc 430 C Ambrel 19 N Recora Co Inc 6100 S Archer Rd Summit III Reeve Electrical Co Inc 120 W 42nd St New York 36 NY (2) Spies Electric Works 564 W Van Buren St Chicago 7 III (2) Worner Electronic Devices Rankin III (1-2-3)

10E. SOUNDING DEVICES

Acme Fire Alarm Company Inc 106 Seventh Ave New York 11 NY (3-6) Auth Electric Co Inc 34-20 45th St L I C 1 NY (1 thru 7) call Co 58 Warden Ave Shelby Ohio (1-2-3cable Electric Products Inc 234 Daboli St Providence 7 RI (6)

Clark-Cooper Co Inc 317 N Market St Palmyra NJ (4-8) No. (4-B)
Couch (5 H) Co Inc 3 Arlington St North Quincy
71 Mass (1-2-3)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza
South Long Island City 1 NY (1)
Edwards Co Inc Norwalk Conn (1 thru 7)
Ellmann Engineering Co 3320 M St NW Washington 7. DC (1-2-3-4-6-7-8)
FEDERAL SIGN & SIGNAL CORP 8726 S State St
Chicago 19 Ill (1 thru 8)—ADV PG 158
Gem Electric Mfg Co Inc 237 37th St Brooklyn
NY (1-2-3)
Hose-MCCann Telephone Co Inc 25th St & 3rd Ave NY (1-2-3)
Hose-McCann Telephone Co Inc 25th St & 3rd Ave
Brooklyn 32 NY (1-2-3)
International Business Machines Corp
International Business Machines Corp
International Business Machines Corp
International Business Machines Corp
International Business Wachines Corp
International Business Wachines Corp
International Corp
International Corp
International Internation Lake mrg to 2323 Chestnut St Cakland Calif (1-2)

Lee Electric Inc 566 52nd St West New York NJ (1-2-3-6)

Liberty Bell Mfg Co Inc Swainboro Ga (1-2-3-6)

Liberty Bell Mfg Co Inc Swainboro Ga (1-2-3-6)

Limenite Electronic Corp 407 S Dearborn St Chicago 5 III (1-2-4-7)

Marvin Electric Mfg Co 648 Santa Fe Ave Los Angeles 21 Calif (6)

National Time & Signal Corp 21800 Wyoming Ave Detroit 37 Mich (1-2-3-4-6)

Nutone Inc Madison & Red Bank Roads Cincinnati 27 Ohio (6)

Partrick & Wilkins Co 51 N Seventh St Phila 6

Pa (1 thru 7)

Portable Light to Inc 216 William St N 738 NY (7) (1-2)

(7) Progress Mfg Co Inc Castor Ave & Tulip St Phila 34 Pa (6) and Pa (6) Inc 120 W 42nd St New York 36 NY (1-2-3) Rittenhouse Co Inc East St Honeoye Falls NY (6) Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa (1-2)Sperti Faraday Inc 1322 E Church St Adrian Mich (1-2-4-6-7) Spies Electric Works 564 W Van Buren St Chicago 7 III (1) Standard Electric Time Co 89 Logan St Spring-field 2 Mass (1-2-3-4-6) Trine Mig Corp 1430 Ferris Place New York 61 NY (1-2) NY (1-2)
Viking Instruments Inc East Haddam Conn (1-2-3-4-5-7)

WHEELOCK SIGNALS INC Branchport Ave Long Branch NJ (1 thru 6-8)—ADV PG 172

10F. SIGNAL & COMMUNICATION SYSTEMS

Calling, paging & locating systems
 In-and-out registers
 Intercom systems and equipment
 Public address systems
 Closed circuit TV
 Master antenna systems

Addrafters Co 325 W Huron St Chicago 10 III (1-3-4)
American Sentry Inc 84 Bethlehem Pike Philadelphia 18 Pa (1-4)
Auth Electric Co Inc 34-20 45th St LIC 1 .NY
(1-2-3-8) (1.-2.3-8)
Autocatic Go and 34-20 45th St LIC 1 NY
(1.-2.3-8)
Autocatic So Swarden Ave Shelby Ohio (1)
Automatic Electric Co North Lake III (3)
Bell Sound Systems Inc 555 Marion Rd Columbus
7 Ohio (4)
Bliss Electronic Corp Sussex NJ (2.-3-4)
Blonder-Tongue Laboratories Inc 9-25 Alling St
Newark 2 NJ (5-6)
Bogen (David) Co Inc Route 4 & Forest Ave (P O
Box 500) Paramus NJ (1.-3-4)
Califone Corp 1041 N Sycamore Ave Hollywood 38
Calif (4)
Cannon Electric Co 3208 Sumbalds Se 1 to Accept Calif (4)
Cannon Electric Co 3208 Sumboldt St Los Angeles
31 Calif (1-2)
COUCH (S H) CO INC 3 Arlington St North Quincy
71 Mass (1-2-3-8)—ADV PG 134
Dalmotron Co 534 Laurel St San Carlos Calif (1-3-4-6)
Diamond Power Specialty Corp P 0 Box 415 Lancaster Ohio (5)
DuKane Corp St Charles III (1-3-4-8)
Electro Devices Inc 116 S Michigan Ave Chicago 3
III (2)

Electro D recutone Inc 415 Lexington Ave N Y 17 NY (1-3-4) Fanon Electric Co Inc 98 Berriman St Brooklyn 8 NY (3) NY (3)
Feiler Engineering & Mfg Co 8026 N Monticello
Ave Skokie III (3)
Femco Inc Irwin Pa (3-7) General Electric Co Industrial Electronics Div Technical Products Dept Electronics Park Syra-cuse NY (5) Godfrey Mfg Co 1633 N Halsted St Chicago 16 III (3)

III (3)

HOSE-McCANN TELEPHONE CO INC 25th St & 3rd

Ave Brooklyn 32 NY (3)—ADV PG 162

Hughes Products Hughes Aircraft Co International

Airport Station Los Angeles 45 Calif (5)

Insul-8-Corp 1369 Industrial Rd San Carlos Calif International Business Machines Corp Times Equip-ment Div 590 Madison Ave New York 22 NY (7)

(7)
Javex P O Box 646 Rediands Calif (6)
Jerrold Electronics Corp 23rd & Chestnut Sts Phila
3 Pa (1.5-6)
Kellogg Switchboard and Supply Co 79 W Monroe
St Chicago 3 III (3-4)
Kin Tel 5725 Kearney Villa Rd San Diego 12
Calif (5)
Kellond (M. P. Co. 8 King St. Magnistrana N.L. Kirkland (H R) Co 8 King St Morristown NJ (1-2)
Lake Mfg Co 2323 Chestnut St Oakland Calif (3-4)
Loge (J M) Sound Engineers 2171 W Washington Blvd Los Angeles 18 Calif (1-3-4)
Mine Safety Appliances Co 201 N Braddock Ave Pittsburgh 8 Pa (3)
Minneapolis-Honeywell Regulator Co 2753 Fourth Ave S Minneapolis B Minn (3)
Motorola Communications & Electronics Inc 4501 W Augusta Blvd Chicago 51 III (1-3)
Newcomb Audio Products Co 6824 Lexington Ave Hollywood 38 Calif (1-4)
Nutone Inc Madison & Red Bank Roads Cincinnati 27 Ohio (3)
O'Brien Electric Corp 6514 Santa Monica Blvd 27 Ohio (3)
O'Brien Electric Corp 6514 Santa Monica Bivd Hollywood 38 Calif (1-3-4)
Partrick & Wilkins Co 51 N Seventh St Phila 6 Pa (1-2)
Perfect-Line Mfg Corp Old Country Rd & Kaliroad Ave P 0 Box 65 Hicksville L I NY (3, Progress Mfg Co Inc Castor Ave & Tulip St Phila 34 Pa (3)
Radio Corp of America Industrial Electronic Products Front & Cooper Sts Camden 2 NJ (1-3-4-5-6) 4-5-6)
Rauland-Borg Corp 3535 West Addison St Chicago
18 III (1-3-4)
Simpson (Mark) Mfg Co Inc 32-28 49th St Long
Island City 3 NY (1-3-4)
Sperti Faraday Inc 1322 E Church St Adrian
Mich (1-2-5) Standard Electric Time Co 89 Logan St Springfield 2 Mass (1-2) Talk-A-Phone Co 1512 S Pulaski Rd Chicago 23 Touch-Plate Mfg Corp Box 1970 Long Beach Calif (1) Webster Electric Co 1900 Clark St Racine Wis (3-4) III (3) (3-4)
Wheeler Electronic Corp 150 E Aurora St Water-bury 20 Conn (3-8)
Wheelock Signals Inc Branchport Ave Long Branch NJ (1) Worner Electronic Devices Rankin III (3)

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

Description, Pages Catalog No. & Mfr.

Code No.

1400	,
10-1	Private Telephone Systems; 20p; Cat. No. 133 (Couch)
10-2	Fire Alarm Systems; 28p; Cat. No. 131 (Couch)
10-3	Hospital Signaling Systems; 12p; Cat. No. 125 (Couch)
10-4	Automatic Audio-Visual Nurse Call System; 16p; Cat. No. 125A (Couch)
10-5	Apartment House Telephone Systems; 16p; Cat. No. 128 (Couch)
10-6	Signaling Equipment & Systems; 160p; Cat. No. 19 (Couch)
10-7	Electrical Indicating Instruments; 36p; Cat. No. 37 (Hickok)
10-8	Intercommunication; 12p; Cat. No. M-14-Al (Webster)
10-9	Signaling Equipment; 35p; Cat. No. 10060 (Edwards)

	2 manual may			an an my At Senten Disseins Cuides (One Cat
10-11	Hospital Signaling Systems; 11p; Cat. No. GE-574 (Edwards)	10-28	Reference Data for TV Systems; 15p; Cat. No. JP-1 (Jerrold)	10-45 Fire Alarm System Planning Guide; 60p; Cat. No. F249 (Gamewell)
10-12	Communications Systems; 11p; Cat. No. CO- 573 (Edwards)	10-29	Cathode-Ray Oscilloscopes; 8p; A-1020 (Tex- tronics)	
10-13		10-30	Self-Policing Annunciator Systems; 19p (Scan)	Write directly to the indicated ad-
10-14	tems; 11p; Cat. No. CL-572 (Edwards) Audible Signals; 14p; Cat. No. 5C (Wheelock)	10-31	Audible Signaling Equipment; 12p; Cat. No. 33-7926 (IBM)	dress for the following, enclosing
10-15	Electrical Test Equipment; 23p; Cat. No. 21 (Industrial Instruments)	10-32	Insulation Resistance Testing Manual; 50p; Cat. No. 13069 (Associated Research)	remittance. To insure correct iden-
10-16	Resistance Measuring; 12p; Cat. No. E-17 (Gray)	10-33	Ground Resistance Testing Manual; 15p; Cat. No. 7215 (Associated Research)	tification of publication desired,
10-17	Ground Fault Detection; 20p; Cat. No. 581-1 (Excel)	10-34	High Voltage Breakdown Testing; 6p; Cat. No. 5-1.1 (Associated Research)	please specify "as listed in the
10-18	Industrial Signals; 44p; Cat. No. 100 (Federal Sign)	10-35	Fire Alarm Catalog; 48p; Cat. No. FA (Auto-	Electrical Products Guide" when
10-19	Switchboard Instruments; 32p; Cat. No. 43- 200 (Westinghouse)	10-36	Paging Systems Catalog; 24p; Cat. No. PA (Autocall)	ordering. Prices are subject to
10-20	Megger Tester Instruction Manual; 100p; Cat. No. 21J (Biddle)	10-37	Visual Alarm Systems; 32p; Cat. No. AN (Autocall)	change.
10-21	Cable Fault Locators; 15p; Cat. No. 65 (Biddle)	10-38	Nurse Saver Calling System; 8p; Cat. No. 221 (Standard Electric)	
10-22	Annunciator Data Book; 29p (Superior)	10-39	Chrono-Tachometers; 16p; Cat. No. 218	American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.:
10-23	Automatic Fire Alarm Systems; 24p; Cat.	*	(Standard Electric)	Master Test Code for Electrical Measurements In Power Circuits, 40p. Price: \$2.00
	No. 73 (New Jersey)	10-40	How to Use Fotoelectric Systems; 18p (Worner)	Speed Measurements, 19p. Price: \$1.50.
10-24	Noise Simplified; 17p; Cat. No. D-Gen-10 (Scott)	10-41	Burglar Alarms; 8p (Warner)	Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.:
10-25	Electric Tachometers; 20p; Cat. No. 540 (Electric Tachometer)	10-42	Panel-Mounting Instruments; 369; Cat. No. LM (Trio)	Electrical Specifications, 1958, 78 pages. Price: \$1.50
10-26	Television for Your Community; 8p; Cat. No. J-1000A (Jerrold)	10-43	The Brunt Faultfinder; 12p; Cat. No. 10M-456 (Parr)	Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

10-10 Fire Alarm Systems; 11p; Cat. No. FA-532 10-27 Reference Data for TV Systems; 15p; Cat. No. 10-44 Panel Meters; 22p (Burton) SD-1 (Jerrold)

SECTION 11. **HEATING & COOLING EQUIPMENT**

11A. ELECTRIC SPACE HEATERS

- Wall panels & units Ceiling panels & units Ceiling & floor cables
- 4. Baseboard units
 5. Floor furnaces
 6. Duct heaters
 7. Steam radiators
 8. Unit heaters, forced air
 9. Central furnaces
 10. Portables

For space heating of buildings. Industrial and commercial heating equipment is listed under "Electric Process Heating" and "Heating Elements". See also "Heat

Acme Electric Heating Co 1217 Washington St Boston 18 Mass (1-4-7-10) Adam (Frank) Electric Co 3647 Windsor PI St

Again (Frank) Electric Co 3047 Windson Pl St Louis Me (1) Allied Precision Industries 425 Stevens St (P 0 Box 149) Geneva III (1-10) Ampere Industries 60 Boston St Newark 3 NJ (1-2-4-10)

(1-2-4-10)
BERKO ELECTRIC MFG CORP 212-40 Jamaica Ave
Queens Village 28 NY (1-2-4-10)—ADV PG 140
Broan Mfg Co Inc Hartford Wis (8)
Can Arm Corp P 0 Bex 156 Champlain NY (1-4-10)

(1.4-10)
Carrier Corp Carrier Parkway Syracuse 1 NY (8)
Cavalier Corp Electric Heating Div 343 W First
St Chattanooga Tenn (1.3-4-5-10)
Celiheat Inc 5212 Hemberg Drive Knoxville Tenn
(1.3-4-8-10)
Circle Air Industries Inc 244 Herkimer St Brooklyn 16 NY (1.4-8-10)
Clarge Each

Clarage Fan Co Kalamazoo Mich (8)

Continental Radiant Glass Heating Corp 1 E 35th St N V 16 NY (1-24-10)

Dixie Raydiant Electric Heat Corp 66 Eleventh St NE Atlanta 9 Ga (1-2-3-10)

Electric Moduts Corp State & Water Sts St Joseph Mich (1-8)

Electric Stamp Deditors Corp 1

Electric Steam Radiator Corp 1 Electric Ave Paris Ky (7-10)

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Ry (7-Electrovector Inc 475 Flushing Ave Brooklyn 5 NY (1-4)

mv tu-9)
Emerson Electric Mfg Co 8100 Florissant Ave
St Louis 21 Mo (10)
Emerson-Prync Co 140 N Towns Ave (P O Box 698)
Pomona Calif (2)

Everwarm Inc 3600 Pleasant Ridge Rd Knoxville Tenn (1-3-10) Tenn (1-3-10)
General Aliliance Corp
Callf (1-2-3-4-10)
General Electric Co Apparatus Sales Div Schenectady 5 NY (8-10)
General Electric Co Construction Materials Div
Wiring Device Dept 95 Hathaway St Providence
RI (3)
Guyan Machinery Co Inc Box 150 Logam W Va (1-10)

(1-10)

11g Electric Ventilating Co 2850 N Pulaski Rd Chicago 41 III (8)
Industrial Ingineering & Equipment Co Inc 24 Hanley Industrial Ct St Louis 17 Mo (6)
International Oil Burner Co 3800 Park Ave St Louis 10 Mo (4)
Kilbury Mfg Co Inc 14529 Hawthorne Bivd Lawndale Calif (8-9)
Knapp-Monarch Co Bent & Potomac St Louis 16
Mo (10)
Kord Mfg Co Inc 4510 White Plains Rd New York

Mo (10)
Mo (10)
NY (10)
NY (10)
Markel Electric Products Inc 145 Seneca St
Buffalo 3 NY (1-2-4-8-10)
Matthews Electric Heater Mfg Co Albertville Ala

(1-5-10)

(1.5-10)
Meler Electric and Machine Co Inc 3525 E Washington St Indianapolis 7 Ind (1.3-10)
Modernheat Cable Corp P O Box 576 Kingsport
Tenn (1.3-10) Nutone Inc Madison & Red Bank Roads Cincinnati 27 Ohio (2-8)

Preway Inc. 1430 Second St North Wisconsin Rapids Wis (10) Roberson Inc. 1539 E 103 St Seattle 55 Wash (1-3-4-8)

Salton Mfg Co Inc 312 E 95 St New York 28 NY (2-10)

(2-10)

(2-10)

Sunwarm Inc 2353 Ft Henry Dr (Box 263) Kingsport Tenn (1-3-4-10)

Thermador Electrical Mfg Co 5119 District Blvd Los Angeles 22 Calif (1-8-10)

Trade-Wind Motorfans Inc 7755 Paramount Blvd Rivera Calif (1)

Victor Ventilator Div Philip Caréy Mfg Co Middletown Ohio (8)

Wilson Padietr Co. 775 Capitol Ave. Hartford 6

town Ohio (8)

Vuican Radiator Co 775 Capitol Ave Hartford 6

Conn (4)

Wesix Electric Heater Co 390 First St San Francisco 5 Calif (1 thru 6-8-10)

Westchester Brickote Products Co Inc Ilamsbridge Rd N v 61 NV (7)

Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa (1-2-3-8-10)

WESTINGHOUSE ELECTRIC SUPPLY CO 3 Gateway Center Pittsburgh 30 Pa (1-4-8-10) ADV PG 2nd Cover

•WIEGAND (EDWIN L) CO 7637 Thomas Blvd Pitts-burgh 8 Pa (1 thru 6-8-10)—ADV PG 81-82-83-84 ing (L J) Mfg Co 303 N Stiles St Linden NJ

11B. HEAT PUMPS

Central, packaged, or custom dual-function units for space heating and cooling of build-

Acme Industries Inc 620 N Mechanic St Jackson Mich Mich American Colls Co Route 524-Lakewood Rd Farm-ingdale NJ Carrier Corp Carrier Corp Carrier Corp Carrier Parkway Syracuse 1 NY Fedders-Quigan Corp 58-01 Grand Ave Maspeth

NY
Forston Co 1400 Conti St Houston 2 Tex
General Electric Co Air Conditioning Dlv Weathertron Dept 5 Lawrence St Bloomfield NJ
General Electric Co Appliance & Television Receiver
Dlv Room Air Conditioner Dept Appliance Park Louisville 1 Ky

11C. ELECTRIC PROCESS HEATING EQUIP-

1. Electric ovens
2. Electric furnaces
3. Electric steam boilers
4. Dielectric heaters
5. Induction heaters
6. Infrared heaters
7. Heating elements
8. Soil & pipe cable or tape

Electrical equipment used to provide heat for applications other than comfort space heating.

Acme Electric Heating Co 1217 Washington St Boston 18 Mass (1-7) Acra Electric Corp 9901 Pacific Ave Franklin Park

Alax Electrothermic Corp Ajax Park Trenton 5 NJ (1-2-5)
Allis-Chalmers Mfg Co 930 5 70th St Milwaukee 1 Wis (1-4-5)
Bellevue Industrial Furnace Co 2620 Crane Are Detroit 14 Mich (1-2)
Blue M Electric Co 136th & Chatham Sts Blue Island III (1-2)
Can Arm Corp P 0 Box 156 Champlain NY (6-7)
Coates Electric Mfg Co 3419 11th Ave SW Seattle
4 Wash (1-2-3)

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Corning Glass Works Corning NY (6-7) Corona Mfg Corp 11300 Tuxford St Sun Valley Calif (1-6-7) Cutler-Hammer Inc 228 N 12th St Milwaukee 1 Wis (7) Dalton Electric Heating Co 11 Goodhue St Salem Mats (7) Despatch Oven Co 619 SE 8th St Minneapolis 14 Minn (1-2-7) minn (1-2-1)
Detroit Electric Furnace Div Kuhlman Electric Co
Bay City Mich (2)
Doyle (J E) Co 1220 W 6th St Cleveland 13 Ohio
(6) (6)
Dry Clime Lamp Corp Greensburg Ind (1-7)
Eagle Electric Mfg Co Inc 23-10 Bridge Plaza South
Long Island City 1 NY (7)
Edison Heatube Div McGraw Edison Co 612 Grand
St Allegan Mich (7)
Electric Arc Inc 152 Jelliff Ave Newark 8 NJ
(1-2-5) Furnace Co W Wilson St Salem Ohlo (2-5-7) Electric Hotpack Co Inc Cottman Ave at Melrose St Phila 35 Pa (1-2) Everwarm Inc 3600 Pleasant Ridge Rd Knoxville Tenn (7)
Falcon Equipment Co 13th St (Box E-255) New Brighton Pa (1-2-7)
Fostoria Pressed Steel Corp N Main St Fostoria Ohio (1-6) Products Co 4720 N 18th St Phila 41 Pa Gem Electric Mfg Co Inc 237 37th St Brooklyn NY (7) NY (7)
General Electric Co Apparatus Sales Div Schenectady 5 NY (1-2-5-7-8)
General Electric Co Apparatus Sales Div Schenectady 5 NY (1-2-5)
Globar Div Carborundum Co Niagara Falls NY (7)
Grieve-Hendry Co Inc 1401-17 W Carroll Ave Chicago 7 III (1-2)
Harold Electric Co 210 E Alder St Walla Walla
Wash (7) er Electric Furnace Corp 39 River St Buffalo NY (2) Wash (7) Harper rys (C I) I RI (1-2-5) Inc 800 Wellington Ave Cranston 10 lectric Co P O Box 563 Milwaukee 1 Huppert (K H) Co 6830 S Cottage Grove Ave Chl-cago 37 III (1-2-7) Induction Heating Core Heating Corp 181 Wythe Ave Brooklyn (1-4-5) Industrial Engineering & Equipment Co Inc 24 Han-ley Industrial Ct St Louis 17 Mo (7) Jensen Inc 9331 Freeland Ave Detroit 28 Mich Kneisley Electric Co 2501-2509 Lagrange St Tolledo 3 Ohio (7) Kord Mfg Co Inc 4510 White Plains Rd New York 70 NY (7) LaRose (W V T) & Associates Inc 31 Ontario St NY (4) Cohoes NY (4)
Lindberg Engineering Co 2450 W Hubbard St Chicago 12 III (1-2)
Lucifer Furnaces Inc Neshaminy Pa (2)
Magnethermic Corp P O Box H Youngstown 7 Michigan Oven Co 415 Brainard Detroit 1 Mich (1) (1)
Midget Heater & Specialty Co 2801 Pacific Ave
Tacoma 4 Wash (7)
Miskella Infra-Red Co E 73rd & Grand Ave Cleveland 4 Ohio (1-6)
Modernheat Cable Corp P O Box 576 Kingsport
Tenn (8) Nelson Electric Mfg Co P O Box 5385 Tulsa Okla North American Electric Lamp Co 1520 North 13th St 5t Louis 6 Mo (1-6) Pereny Equipment Co 893 Chambers Rd (Station A Box 153) Columbus Ohlo (1-2) Potter & Rayfield Inc P O Box 1042 Atlanta Ga I Inc 1889 Front St Cuyahoga Falls Ohio Reeve Elect III (4-5) Electronics Inc 609 W Lake St Chicago 6 III (4-5)
Roberson Inc 1539 E 103 St Seattle 55 Wash (8)
Safeway Heat Elements Inc Newfield St (P 0 Box 1109) Middletown Conn (7)
Scientific Electric Inc 105-109 Monroe St Garfield NJ (4-5) Industrial Electronics Div of Engineering Inc 108 N Gill St State College Pa (1-4-5) Siebring Mfg Co George Iowa (3-7) Smith-Gates Corp Farmington Conn (7) Southeast Lighting Inc 521 E 20 St Charlotte 1 NC (6) Sta-Warm Electric Co 53 N Chestnut St Ravenna Ohio (1-2) Ohio (1-2)
Star-A Electric Mfg Co Inc 269 Meserole St
Brooklyn 6 NY (7)
Steiner-lves Co Springfield Rd Union NJ (1)
Syntron Co 690 Lexington Ave Hemer City Pa (7)
Tec Imports 14525 Bessemer St Van Nuys Calif Thermal American Fused Quartz Co 18 Salem St Dover NJ (7) Thermo Electric Mfg Co 465 Huff St Dubuque lowa (2-7) Tocco Div Ohio Crankshaft Co 3800 Harvard Ave Cleveland 5 Ohio (5) Trent Inc 201-299 Leverington Ave Phila 27 Pa (1-2-7)

Triangle Equipment Co Inc 45 River Rd Nutley 10 NJ (1-6)

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Trindl Products Ltd 1807-11 S Clark St Chicago Trippe Mfg Co 133 N Jefferson St Chicago 6 III Tuttle & Kift Inc 1823 N Monitor St Chicago 39 (George) Co 413-15 Market St Newark 5 NJ (7) Velotron Inc 1186 Broadway New York 1 NY (1-6) Vulcan Electric Co 88 Holten St Danvers Mass (7) Waage Electric Inc 720 Colfax Ave Kenilworth NJ Watlow Electric Mfg Co 1376 Ferguson Ave St Louis 14 Mo (7) Wesix Electric Heater Co 390 First St San Fran-cisco 5 Calif (6-7-8) cisco 5 Calif (6-7-8)
Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa (4-5-6)
Whitaker (Douglas C) Co Inc 141 E Glenside Ave
Glenside Pa (6)

WHEGAND (EDWIN L) CO 7637 Thomas Bivd Pittsburgh 8 Pa (6-7)—ADV PG 81-82-83-84
Wil-Son Mfg Co Coverport Ky (1-6)
Young Bros Co 1831 Columbus Rd Cleveland 13
Ohio (1-4)

11E. AIR CONDITIONERS

Industrial & commercial
 Residential, central unit
 Residential, room console
 Wall, built in
 Window
 Portable

Equipment using refrigerating-cycle principle to cool air.

Acme Industries Inc 620 N Mechanic St Jackson Acme Industries Inc 620 N Mechanic St Jackson Mich (1-2)
Air & Refrigeration Corp 439 Madison Ave New York City NY (1)
Airtemp Div Chrysler Corp 1600 Webster St Dayton 1 Ohio (1-2-4-5)
American Blower Div of American-Standard Detroit 32 Mich (1)
American Colis Co Route 524-Lakewood Rd Farmingdale NJ (1-2)
Carrier Corp Carrier Parkway Syracuse 1 NY

(1-2-3-4-5-6) ile Air Industries Inc 244 Herkimer St Brooklyn 6 NY (1-2-4) Clarage Fan Co Kalamazoo Mich (1)
Cool-ette Inc 7535 W 8 Mile Rd Detroit 21 Mich

(1-2-4) Co Refrigeration Div 1905 Kienlen Ave St Louis 20 Mo (1-2-3)
Emerson Electric Mfg Co 8100 Florissant Ave St Louis 21 Mo (5)
Fedders-Quipan Corp 58-01 Grand Ave Maspeth NY (1-2-3-4-5)
Forston Co 1400 Conti St Houston 2 Tex (1-2-5)
Frestrind-Arire Div Cory Corp 221 N LaSalle St Chicago III (5)
Frick Co Waynesboro Pa (1)
Frigldaire Div General Motors Corp 300 Taylor St Dayton 1 Ohio (1-2-4-5)
General Electric Co Air Conditioning Div Comm & Indus Air Conditioning Dept 5 Lawrence St Bloomfield NJ (1) (1-2-4)

General Electric Co Air Conditioning Div Home Heating & Cooling Dept Troup Highway Tyler Tex (2)

Heating & Cooling Dept Troup Highway Tyler
Tex (2)
General Electric Co Appliance & Television Receiver
Div Room Air Conditioner Dept Appliance Park
Louisville 1 Ky (4-5)
Gibson Refrigerator Co 515-615 W Williams St
Greenville Mich (1-2-4-5)
GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (1 thru 5)—ADV PG 2
Hastings Air Conditioning Co Inc 108 S Colorado
Ave Hastings Neb (1-2)
Hoyt Mfg Corp Forge Rd Wesport Mass (1)
Kauffman Air Conditioning Co 4505 Olive St St
Louis Mo (1-2-3-4-5)
King Refrigerator Corp 76-02 Woodhaven Blvd
Glendale 27 NY (4-5)
Larco Inc Route 20 East Painesville Ohio (1)
Mitchell Mfg Co 3200 W Peterson Ave Chicago 45
III (1-2-4-5)
Mueller Climator (2005 W Oklahoma Ave Mil-Mueller Climatrol 2005 W Oklahoma Ave Mil-waukee 1 Wis (1-2-4)

Mfg Corp 46 Oliver St Newark 5 NJ (1-2-4-5)Ready-Power Co 11231 Freud Ave Detroit 14 Mich (1-2) micn (1-2)
Remington Corp Remington Air Conditioning Div
Willey St Auburn NY (1-2-3-4-5)
Sutton (0 A) Corp 1812 W Second Wichita Kans
(1-2-4-5) Trane Co 2nd & Cameron Ave La Cross Wis (1-3-4) (1-3-4)
United States Air Conditioning Corp 7900 Tabor
Rd Philadelphia 11 Pa (1-2)
United States Air Conditioning Corp P 0 Box 360
Delaware Ohio (1-2)
Welbilt Corp 57-18 Flushing Ave Maspeth 78 LI

NY (5)
Westinghouse Electric Corp P 0 Box 868 Plttsburgh 30 Pa (1 thru 5)
Whirlpool Corp St Joseph Mich (1-2-4-5)
Worthington Corp Worthington Ave Harrison NJ
(1-2-3-4) NY (5)

Roosevelt & PRR York Pa (1 thru 5)

11F. AIR HANDLING EQUIPMENT

Blowers
 Circulating fans, industrial & commercial
 Circulating fans, industrial & commercial
 Exhaust fans, residential
 Portable fans

Equipment used for ventilation exhaust, or circulation of air. See also Air Con-

Aerovent Fan Co Inc. Ash and Bloch Sts Piqua Ohio (1-2-3-5)
Air Controls Inc. 2310 Superior Ave Cleveland 14 Ohio (2-3-4-5)
Air-Marine Motors Inc. 369 Bay View Ave Amity-ville NY (1)
Airfan Engineering Co. 7401 Telegrønh Rd. Los Angeles 22 Calif (1-3)
Allen Cooler & Ventilator Inc. 704 Noodward St. Rochester Mich (1-2-3-4)
Alliance Mfg Co Inc. Lake Park Blvd Alliance Ohio (5)
Allis-Chalmers Mfg Co. 930 S 70th St. Milwaukee Atlis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (1) co Mfg Co 119 Braintree St Boston 34 Mass

(3-4)

• AMERICAN BLOWER DIV OF AMERICAN-STANDARD Detroit 32 Mich (1-2-3-4)—ADV PG 102

American Coolair Corp 3604 Mayflower St (P 0

Box 2300) Jacksonville 3 Fla (2-3-4)

Ammerman Co Inc 110 N 2nd St Minneapolis

Minn (1-2-3-5)

Arex Co 612 N Michigan Ave Chicago 11 III

(2-3) Argo Products Co 1008 N 22 St St Louis 6 Mo (2-3-4-5) (2-5-4-5) rlas Tooi and Mfg Co 5147 Natural Bridge Ave St Louis 15 Mo (4-5) rhnson Co 1001 S Marshall St Winston-Salem

Mo (2-3-4-5)
Bar-Brook Mfg Co Inc Shreveport La (2-3-4) Berns Air King Corp 3050 N Rockwell St Chicago 111 (4)

III (4)
Bertram (Harvey P) Co 2225 Bogen St Cincinnati
Ohio (1-2-3-5)
Froan Mfg Co Inc Hartford Wis (3-4)
Buffalo Forge Co 490 Broadway Buffalo 5 NY
(1-2-3-4)
Burt Mfg Co 936 5 High St Akron 11 Ohio (3-4)
Century Fan & Ventilator Co 45 Cedar St Stamford Conn (1-3)
Chatea Fan and Blower Co 639 South Ave Plainford Conn (1-3)
Chelsea Fan and Blower Co 639 South Ave Plainfield NJ (1-2-34-5)
Chicago Blower Corp 9867 Pacific Ave Franklin Circle Air Industria

Circle Air Industries Inc 244 Herkimer St Brooklyn 16 NY (1)

Circle Air Industries Inc 244 Markimer St. Brooklyn
16 NY (1)
Clarage Fan Co. Kalamazoo Mich (1-2-3)
Commercialaire Corp of America 840 E 98 St.
Brooklyn 36 NY (1 thru 5)
Coppus Engineering Corp 344 Park Ave Worcester
10 Mass (1-5)
Dana Fan & Blower Corp 2644 Colerain Ave Cincinnati 14 Ohio (3-4)
Pavidson Fan Co 213 California St. Newton 58
Mass (3)
Davton Electric Mfg Co 126 S Oakley Blvd Chicago

Dayton Electric Mfg Co 126 S Oakley Blvd Chicago

Devilbiss Co 300 Phillips Ave Toledo 1 Ohlo (3) Diehl Mfg Co 1187 Finderne Ave Somerville NJ (2-3-4-5) Electric Corp 150 Elm St Mansfield

Dominion Electric Corp 150 Elm St. Mansheld Ohio (3-4-5) Elliott Co. Jeannette Pa (1) Emerson-Pryne Co. 140 N Towne Ave (P. 0 Box 698) Pomona Calif (1-3-4-5) Folsom Co. Inc. 3104 Oak Lane Dallas 26 Tex. (2-3-4-5) (2-3-4-5)
Fresh'nd-Aire Div Cory Corp 221 N LaSalle St Chicago III (5)
Frigid Inc 128-168 32nd St Brooklyn 32 NY (1-2-3-4-6)

Garden City Fan Co 801 N Eighth St Niles Mich (1-2-3)

(1-2-3)
General Blower Co 8610 Ferris Ave Morton Grove
III (1-2-3)
GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (1 thru 5)—ADV PG 144
Hamilton Fan & Blower Co 2644 Colerain Ave Cinclinati 14 Ohio (1-2-3-4)
Hartzell Propeller Fan Co S Englert Ave Piqua
Ohio (1-2-3-5)
Ohio (1-2-3-5)
Ohio (1-2-3-5)
Ohio (1-2-3-5) nan-Pohle Co Inc 300 Lent Ave Le Roy NY Hirsch (2-3)

(2-3)
Hunter Div Robbins & Myers Inc 2500 Frisco
Memphis 14 Tenn (2-3-4-5)
Ilg Electric Ventilating Co 2850 N Pulaski Rd
Chicago 41 III (1-2-3-4-5)
Industrial Plastic Fabricators Inc Endicott St Norwood Mass (1-3)
International Oil Burner Co 3800 Park Ave St
Louis 10 Mo (4)

Constitution Co Inc. 2821-29 W Dauphin St

Louis 10 Mo (4)
Iona Ventilator Co Inc 2821-29 W Dauphin St
Phila 32 Pa (2-3)
Jeffrey Mfg Co 832 N 4th St Columbus 16 Ohio
(1-3) Kisco Co Inc 2414 De Kalb St St Louis 4 Me (4-5) (4-27) Kord Mfg Co Inc 4510 White Plains Rd New York 70 NY (2-3-4-5) Lau Blower Co 2001 Home Ave Dayton 7 Ohio (1-2-34-5) Markel Electric Products Inc 145 Seneca St Buf-

Martin Fan. & Blower Co 46.34 W 21st PI Chicago 50 III (1-2-3-4-5) Marvin Electric Mfg Co 648 Santa Fe Ave Los Angeles 21 Calif (4) McLarty Systems 2600 Dickman Rd Battle Creek Mich (3) Mich (3)

Mich (3)

Michean Engineering Laboratories 70 Washington Rd (P 0 Box 228) Princeton NJ (2-3-4)

Meier Electric and Machine Co Inc 3525 E Washington St Indianapolis 7 Ind (2-3-4-5)

Mueller Climatrol 2005 W Oklahoma Ave Millwarky Mfg Corp P 0 Box 669 Covington Ky (3-4)

Morthern Blown Co. (3-4)
Morthern Blower Co 6434 Barberton Ave Cleveland
2 Ohio (3)
Nutione Inc. Madison & Red Bank Roads Cincinnati
27 Ohio (4) Peerless Electric Co 1401 W Market St Warren Ohio (1-2-3-4) Ave P 0 Box 65 Hicksville L I NY (3-4)
Phelps Fan Mfg Cor 715 Thomas St Little Rock
Ark (2-3-4) Ark (2-3-4)
Reed Unit-Fans Inc 1001 St Charles Ave New Orleans La (1-2-3-4-5)
Reynolds Electric Co 3000 River Rd River Grove Uriestos Reynolds Electric Co 3000 River -111 (2-5) Rich (Phil) Fan Mfg Co Inc 2900 Caroline Houston 4 Texas (2-3-4-5) Muere Inc 1345 Lagonda Ave Spring-Texas (2-3-4-5)
Robbins & Myers Inc 1345 Lagonda Ave Spring-field Ohio (1-2-3-4)
Roberson Inc 1539 E 103 St Seattle 55 Wash (3) (3)
Shalicross Controls Inc 2217-21 N 31 St Mil-wauke 8 Wis (1)
Slebring Mfg Co George Iowa (2-3)
Signal Electric Div King-Seeley Corp 1800 13th St Menominee Mich (2-3-4)
Simpson Co 1060 E 11th St Oakland 6 Calif (4)
Skil Corp 5033 Eiston Ave Chicago 30 11l (1)
Smith-Gates Corp Farmington Conn (3-4)
Stanat Mfg Co Inc 524 Shames Dr Westbury NY (1) Standard Electric Mig Co Inc. Haddon Ave West Berlin NJ (2-3-4)
Stewart Industries Inc 320 E St Joseph St Indianapolis 2 Ind (4)
Sutton (0 A) Corp 1812 W Second Wichita Kans (2-3-4-5)
Thermador Electrical Mig Co 5119 District Blvd Los Angeles 22 Calif (4)
Trade-Wind Motorfans Inc 7755 Paramount Blvd Rilvera Calif (1-3-4)
Trane Co 2nd & Cameron Ave La Cross Wis (3)
Winted Electric Motor Co 178 Centre St NY 13
NY (1)
Winted Electric Motor Co 178 Centre St NY 13
NY (1) WY (1)
United States Air Conditioning Corp P 0 Box 360
Defaware Ohio (1)
Valley Fan Mfg Co Box 206 Fort Valley Ga
(2-3-4-5) (2-3-4-5)
Victor Ventilator Div Philip Carey Mfg Co Middletown Ohio (3-4)
Viking Air Products 5601 Walworth Ave Cleveland 2 Ohio (1-4)
West Wind Corp 1800 Airport Way Seattle 4
Wash (4) Flortic Corp. D.O. Rev. 800 Wash (4)
Westinghouse Electric Corp P 0 Box 868 Pittsburgh 30 Pa (1.3-4)
Westinghouse Electric Corp Sturtevant Div Damon
St Hyde Park Boston 36 Mass (1-3)
Wind-Way Fan & Ventilator Co 531 St Joseph St
New Orleans 12 La (2-3-4)
Wing (L J) Mfg Co 303 N Stiles St Linden NJ
(1-3)

11G. HUMIDIFIERS & DEHUMIDIFIERS

For control of air moisture content.

Air & Refrigeration Corp 439 Madison Ave New Vork City NY

American Blower Div of American-Standard Detroit 32 Mich

Bahnson Co 1001 S Marshall St Winston-Salem NC Berns Air King Corp 3050 N Reckwell St Chi-Berns Air King Corp 3050 N Nockwell St Chi-cago III Carrier Corp Carrier Parkway Syracuse 1 NY Dampp-Chaser Inc 1440 Ridgewood Blvd Hender-sonville NC Dryomatic Corp 806 N Fairfax St Alexandria Ebco Mfg Co 265 N Hamilton Rd Columbus 13 Ohio Fedders-Quigan Corp 58-01 Grand Ave Maspeth NY Frigidaire Div General Motors Corp 300 Taylor St Dayton 1 Ohio Gibson Refrigerator Co 515-615 W Williams St Greenville Mich Haertel (Walter) Co 2840 4th Ave So Minneapolis Minn Mitchell Mfg Co 3200 W Peterson Ave Chicago III Mueller Climatrol 2005 W Oklahoma Ave Mil-Mueller Climatrol 2005 W Oklahoma Ave Milwaukee I Wis
Remington Corp Remington Air Conditioning Div
Willey St Auburn NY
Roberson Inc 1539 E 103 St Seattle 55 Wash
Supreme Electric Products Co 194 Vassar St
Rochester 7 NY
Trane Co 2nd & Cameron Ave La Crosse Wis
Viking Air Products 5601 Walworth Ave Cleveland
2 Ohio Walton Laboratories Inc 1186 Grove St Irvington 11 NJ Westinghouse Electric Corp Sturtevant Div Damon St Hyde Park Boston 36 Mass Whirlpool Corp St Joseph Mich Worthington Corp Worthington Ave Harrison NJ

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

*Code No.	Description, Pages Catalog No. & Mfr.
11-1	Electric Blast Coil Heaters for Package Air Conditioners; 24p; Cat. No. E-97P (In- dustrial Engineering)
11-2	Electric Blast Coil Heaters for Installation in Ducts; 20p; Cat. No. E-97U (Industrial Engineering)
11-3	Industrial Ovens; 8p (Dry Clime)
11-4	Industrial Ovens & Dryers; 16p; Cat. No. 157 (Young)
11-5	Residential & Commercial Air-Cooled Air Con- ditioners; 12p; Cat. No. 83A (U. S. Air)
11-6	Propeller Fans, Propellers & Accessories; 12p; Cat. No. CEG-150 (Hamilton)
11-7	Steel Melting Furnaces; 16; Cat No. 11C

11-8	Converter-Type Induction No. 14B (Ajax)	Furnaces;	16p;	Cat.
11-9	Radiant Glass Electric No. 83 (Can-Arm)	Heaters;	20p;	Cat.
11-10	Electric Heating Handboo (Can-Arm)	ok; 32p; C	at. No	. 84

Applications Handbook, Electric Heat Ele-ments; 12p; Cat. No. D (Acra) 11-11 11-12 Infra-Red Ovens: 20p (Jensen)

Fan-Coil Air Conditioners; 32p; Cat. No. 1-216 (York)

11-14 Twinline Air Conditioning Systems; 8p; Cat. No. G-57-460 (York)

11-15 Induction Heating; 8p; Cat. No. 23 (Tocco)

11-16 Induction Heating Equipment; 20p; Cat. No. 22G (Tocco)

11-17 Induction Heating Equipment; 52p; Cat. No. D2 (Induction Heating)

11-18 Fan Engineering Data; 16p; Cat. No. A-108 (Hartzell)

11-19 Electric Ovens & Furnaces; 68p; Cat. No. 156 Industrial Radiant Heaters; 14p; Cat. No. PE-60 (Corning)

11-21 Electric Heating; 16p; Cat. No. M-3694

11-22 Electric Furnaces & Ovens; 45p (Huppert)

Residential & Commercial Electric Heating; 16p; Cat. No. RCEH (Wesix) 11-23

Commercial & Industrial Electric Heating; 20p; Cat. No. CIEH (Wesix)

11-25 Electric Heating Elements; 33p; Cat. No. 1958 (Vulcan)

Electric Furnaces; 20p; Cat. No. 57 (Thermo)

Air Engineering Data File; 24p; Cat. No. E-57 (Aerovent) 11-27

11-28 Electrically Heated Industrial Equipment; 67p (Trent)

11-29 Electric Heating Units & Equipment; 48p; Cat. No. 50 (Wiegand)

Write directly to the indicated address for the following, enclosing remittance. To insure correct identification of publication desired, please specify "as listed in the Electrical Products Guide" when ordering. Prices are subject to change.

American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.: Letter Symbols for Heat and Thermodynamics, 14p.

Price: \$1.50
Graphical Symbols for Heating, Vo.
Conditioning, 14p. Price: \$1.50 Symbols for Heating, Ventilating and Air

Air Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N.W. Washington 6, D. C. Corrosion and Its Prevention, 25p. Price: 75
Properties of Commonly Used Refrigerants,

Properties of Commonly Used Refrigerants, 135p.
Price: \$2.00
Standard for Room Air Conditioners and Cooling
Load Estimate Form, 7p. Price: 35¢
Standard for Unitary Air-Conditioning Equipment
and Cooling Load Estimate Form, 9p. Price: 45¢
Application Engineering Standard for Year-Round
Residential Air Conditioning, 10p. Price: 50¢
Application Engineering Standard for Air Conditioning, 16p. Price: \$1.00
Standard for Unitary Heat Pump Equipment, 7p.
Price: 35¢

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price: \$1.50

SECTION 12. TOOLS, SUPPLIES & EQUIPMENT

12A. LINEMEN'S TOOLS & ACCESSORIES

1. Climbing equipment
2. Disconnect sticks
3. Hoists, lacks, gins & winches
4. Pike poles & tongs
5. Protective clothing
6. Tamping, digging & trenching hand tools
7. Tool pouches, buckets & accessory bags
8. Tree trimmers & pruners
9. Wire-stringing equipment

Heavy mobile pole line equipment is listed under "Line Trucks & Mobile Equipment" in Section 1.

Adams Engineering Co 31711 Solon Rd Solon Ohio (3) Bartlett Mfg Co 3003 E Grand Blvd Detroit 2 Mich (8) (W M) Co Bashlin Bldg Grove City Pa dendieck Tool Co P O Box 499 Taylorville Ili (2-3-4-8) Buffalo Machine Mfg Co 586 Tonawanda St Buffalo 7 NY (9) 7 NY (9)
Nance (A B) Co 210 North Allen St Centralla
Mo (2-3-4-6-7-8) Chance Charleston Rubber Co Stark Industrial Park Charleston SC (5)

Chicago P NY (3) Pneumatic Tool Co 6 E 44 St NY 17 Chisholm-Moore Hoist Div Columbus McKinnon Chain Corp 6072 Fremont Ave Tonawanda NY (3) Coffing Hoist Div Duff-Norton Co Danville III

Cope (T J) Div Rome Cable Corp Collegeville 5 Pa (3)

David's Gloves Inc 21 W Pleasant St Springfield Ohio (5) Dicke Tool Co 1201 Warren Ave Downers Grove Distribution & High Line Specialties Co 2100 Del Norte St Louis 17 Mo (9) Dixie Logging Tool Co Chattanooga Tenn (4-6) Dorsey (John E) Co 570 E First St Boston 27 Mass (5) Mass (5) General Scientific Equipment Co 7516 Limekiln Pike Philadelphia 50 Pa (5-7) Goodall Rubber Co 493 Whitehead Rd Trenton NJ (5) Greenlee Tool Co 2136 Twelfth St Rockford III Handy Angle Div Lug-All Co 355 Lancaster Ave Haverford Pa (3) Highway Trailer Co 405 E Fulton St Edgerton Wis (3) H) Corp 4100 W 150 St Cleveland 11 Holan (J H Hubbard & Co 6301 Butler St Pittsburgh 1 Pa (6-9) Hunter Tools 9851 Alburtis St Santa Fe Springs Calif (7) Calif (7)
Hykon Mfg Co 163 E State St (P O Box 923 EP)
Alliance Ohio (3)
Ingersoll-Rand Co 11 Broadway NY 4 NY (3)
Joslyn Mfg & Supply Co 3700 S Morgan St Chicago 9 111 (3-4-6-8) Joslyn Mfg & Supply Co 3700 S Morgan St Chicago 9 III (3-46-6-8-9)
Kearney (James R) Corp 4336 Clayton Ave St Louis 10 Mo (2-6-7-8)
Kellogg Switchboard and Supply Co 79 W Monroe St Chicago 3 III (1-7-8-9)
King Mfg Corp 3146 N Chicago Ave Chicago 22 III (3)
Klein (Mathias) & Sons 7200 McCormick Rd Chicago 45 III (1-3-7-9)
Kline Savidge Co Inc 163 N Third St Phila 6 Pa (1-7) LeTourneau (R G) Inc 2399 S MacArthur Long-Lirourneau (v. 1) Inc. 2399 5 MacArchur Long-view Tex (3) Line Material Industries McGraw-Edison Co 700 W Mitchigan St. Milwaukee Wis (2-6-9) Mail Tool Co 25000 S Western Ave Park Forest III (6) McCabe-Powers Body Co 5900 N Broadway St Louis 15 Mo (3) Miller Equipment Co Inc 13th & New Sts Franklin iller Equipment Co Inc 13th & New Sts Franklin Pa (1-7) Pa (1-7)
Miller-Robinson Co 7007 Avalon Blvd Los Angeles
3 Calif (8)
Mine Safety Appliances Co 201 N Braddock Ave
Pittsburgh 8 Pa (1-5-7)
Mitchell Industries Inc Box 17 Municipal Airport
Mineral Wells Tex (1)
Robot Appliances Inc 7041 Orchard St Dearborn Robot Appliances Inc 7041 Orchard St Dearborn Mich (3)
S & C Electric Co 4435 Ravenswood Ave Chicago 40 III (2)
Safety Live Line Tool Co 973 86th Ave Oakland 21 Calif (2-3-47-7-9) en Derrick Co 3101 Grand Ave Chicago III (3) Shaw-Box Crane & Hoist Div Manning Maxwell & Moore Inc Muskegon Mich (3) Shaw-Box Relily Inc 1 Broad St Chattanooga 2 Tenn (3-9) Silent Hoist & Crane Co 841-63rd St Brooklyn 20 NY (3) Snyder (M L) & Son Inc 1897 E York St Phila 25 Southern Electrical Equipment Co 308 West Bland at Mint St Charlotte 3 NC (2) Surety Rubber Co North High St Carrollton Ohio (5) Swett (A L) Iron Works 166 Glenwood Ave Medina NY (3-6) Templeton Kenly & Co Gardner Rd Broadview III (3)
Tulsa Winch Div Vickers Inc 815 E First St Tulsa
20 Okla (3)
Utilities Safety Supply Co Inc Jefferson St &
Highway 50 Lee's Summit Mo (1-7)
Utilities Service Co 1 Pine St Allentown Pa
(3-4) (3-4)
Watteredge Co 19629 West Lake Rd Rocky River
16 Ohio (9)
Wilson Rubber Co 1200 Garfield Ave S W Canton
6 Ohio (5)

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128. WIRE & CABLE TOOLS & EQUIPMENT

Benders, cable a strand
 Cutting, stripping & splicing tools
 Wire gages
 Pulling-in grips, guides, jacks & winches
 Wire reels, lifts, stands & carts
 Pressure-connector tools
 Staplers
 Twisters
 Wire measurers
 Wire measurers
 Wire measurers
 Wire tape, grips, pullers, reels & leaders
 Tish tape, grips, pullers, reels & leaders

AMP Inc Eisenhower Blvd Harrisburg Pa (2-6) Adams Engineering Co 31711 Solon Rd Solon Ohio (4-5) Allen from & Steel Co P O Box 550 Norristown Pa (5-9) Pa (5-9)
American Pulley Co 4200 Wissahickon Ave Phila
29 Pa (5)
Anthony (F M) Co 713 University Ave Berkeley 10
Calif (2-6) Calif (2-6) Appleton Electric Co 1701-59 Wellington Ave Chl-cago 13 III (1-5-11) Arjac Products Inc 55-59 Halstead St Rochester 10 NV (1) Ark-Les Switch Corp 51 Water St Watertown Mass (6) Armature Coil Equipment Inc 2605 Vega Ave Cleveland 13 Ohio (5) Arrolet Corp Foot of Bower St Montgomery Pa (11)

(11)

ARROW FASTENER CO INC 1 Junius St. Brooklyn
12 NY (7)—ADV PG 146
Arsco Mfg & Sales Corp 451 Tenth Ave New York
18 NY (2)
Artos Engineering Co 2757 S 28 St. Milwaukee 46
Wis (2-9) Wis (2-9)
Associated American Trading Div Syrkus & Guttman
Inc 750 St Ann's Ave New York 56 NY (9)
Barth Corp 12650 Brookpark Rd Cleveland 30
Ohio (4-11)

Ohio (4-1)
Bashlin (W M) Co Bashlin Bldg Grove City Pa (4)
Black & Decker Mfg Co Towson 4 Md (2)
Bodendieck Tool Co P O Box 499 Taylorville III (2)
BUCHANNA ELECTRICAL PRODUCTS CORP 237
U S Route 22 Hillside NJ (2-6)—ADV PG 110
Burndy Corp Norwall Conn (3-6)
Cam-Lok Div Empire Products Inc 9201 Blue Ash
Rd (Box 98) Cincinnati 36 Ohio (2-6-10)
Clauss Cutlery Co Frement Ohio (2)
COLUMBIA PRODUCTS INC Wrightsville Pa (5-9)
—ADV PG 144

—ADV PG 144

Cope (T J) Div Rome Cable Corp Collegeville 5

Pa (1-4-11) Electric Co 28 Parker St Wallingford Conn (2-9) (2-9)
Dicke Tool Co 1201 Warren Ave Lumins
III (4-5)
Distribution & High Line Specialties Co 2100 Del
Norte St Louis 17 Mo (5)
Ericson Mfg Co 5209 Euclid Ave P O Box 1401
Cleveland 3 Ohio (5)
Fargo Mfg Co Inc 845 Main St Poughkeepsie NY
12-4)

Cleveland 3 Unio 37 Fargo Mfg Co Inc 845 Main St Poughkeepsie NY (2-4)
FULLMAN MFG CO 1209-1215 Jefferson St Latrobe Pa (11)—ADV PG 120
General Cement Mfg Co 400 S Wyman St Rock-General Cement Mrg Co 400 S Wyman St Rock-ford III (2) General Hardware Mfg Co Inc 80 White St NY 13 NY (2-3)

NY (2-3)
Gleason Reel Corp 740 N Plankinton Ave Milwaukee 3 Wis (5)
GRAYBAR ELECTRIC CO INC 420 Lexington Ave
NY 17 NY (2-4-6)—ADV PG 2
GREENLEE TOOL CO 2136 Twelfth St Rockford
III (4)—ADV PG 100-101

Heller Industrial Fastener Div Heller Roberts Mfg Corp 2135 E Superior Ave Cleveland 14 Ohio Highway Trailer Co 405 E Fulton St Edgerton Wis (4) Holan (J H) Corp 4100 W 150 St Cleveland 11 Ohio (4-5) Holub Industries Inc 442 Elm St Sycamore III (2-11) Husky Products Inc 5300 Vine St Cincinnati 17 Ohio (4)

Ohio (4)
Hykon Mfg Co 163 E State St (P O Box 923 EP)
Alliance Ohio (5-9)

IDEAL INDUSTRIES INC 5136 Park Ave Sycamore
III (2-6-11)—ADV PG 124
Interstate Drop Forge Co Special Products Div
4051 N 27 St Milwaukee 16 Wis (2)
Jerrold Electronics Corp 23rd & Chestnut Sts Phila
3 Pa (2-6) Joslyn Mfg & Supply Co 3700 S Morgan St Chicago 9 111 (6) 109 Mfg Co Electrical Products Div 1201 Mack-lind Ave St Louis 10 Mo (10) Kellems Co Inc 15 Williams St Stonington Conn

(4)

Kellogg Switchboard and Supply Co 79 W Monroe St Chicago 3 III (2-4)

King Mrg Corp 3146 N Chicago Ave Chicago 22 III (4)

Klein (Mathias) & Sons 7200 McCormick Rd Chicago 45 III (2-4-8-11)

Lew Electric Fittings Co 627 W Lake St Chicago 6 III (11)

Line Material Industries McGraw-Edison Co 700 W Michigan St Milwaukee Wis (1-4)

Lint (Clyde W) 2323 W 18 St Chicago 8 III (9-11)

• MADISON EQUIPMENT CO 5405 Detroit Ave Cleveland 2 • Ohio (2-5-9-11)—ADV PG 167 Martindale Electric Co 1383 Hird Ave Cleveland 7 • Ohio (22) 7 Ohio (2) Maryel Rack Mfg Co Inc 24 N First St Min-neapolis 1 Minn (9) Midwest Electric Mfg Co 1639 Walnut St Chicago 12 III (11) Equipment Co Inc 13th & New Sts Franklin Pa (2)

Milwaukee Parts Corp 607-15 S Sixth St Milwaukee 4 Wis (2)

Milme Safety Appliances Co 201 N Braddock Ave Pittsburgh B Pa (2)

Minneapolis 3 Minn (9)

Montgomery & Co Inc 7 Tichenor Lane Newark 2 NJ (2)

Olympic Instrument Laboratoria Six Franklin Olympic Instrument Laboratories Vashon Wash Roll-A-Reel Co 4630 Reading Rd Cincinnati 29 Ohio (5)

Rush Wire Stripper Div Eraser Co Inc 1068 S Clinton St Syracuse 4 NY (2-8) Sherman (H B) Mfg Co 22 Barney Battle Creek Mich (4-5-6) Snap-on-Tools Corp 8028 28th Ave Kenosha Wis (2) Speedex Mfg Co 418 S Wyman St Rockford III (2)
Starett (L S) Co Athol Mass (3)
Steel City Electric Co 1207 Columbus Ave Pitts-burgh 33 Pa (11)
Steel Electric Products Co Inc 5602 18th Ave Brooklyn 4 NY (11)
Suttle Equipment Corp 135 S LaSalle St Chicago 3 III (5) (2) 3 III (5)
Templeton Kenly & Co Gardner Rd Broadview III
(4) (4)

(4)

Thomas & Betts Co 36 Butler St Elizabeth 1
NJ (2-6-11)

NJ (2-6-11)

NJ (2-6-11)

Thomas Instrument Co Box 41 Liverpool Rd

Phoenix NY (2)

Tomic Sales & Engineering Co 20000 Sherwood

Ave Detroit 34 Mich (2)

Triton Mfg Co Inc East Haddam Conn (2)

Utica Drop Forge & Tool Div Keisey-Hayes Co

Utica 4 NY (2)

Vaco Products Co 317 E Ontario St Chicago 11

III (6) III (6)
Velocity Power Tool Co 201 N Braddock Ave Pittsburgh 8 Pa (4)
Waldman (John J) 20 Warren St New York 7
NY (9)
Whitaker Reel Mfg Co 3704 Jackson St (P 0
Box 1318) Monroe La (5)
Woodhead (Daniel) Co 15 N Jefferson St Chicago
6 III (2-5)
Vorkville Metal Products Co 677 Broadway NY 12
NY (2)

12C. RACEWAY TOOLS & EQUIPMENT

Benders & hickeys, conduit & EMT
 Cutters & indenters, conduit & EMT
 Conduit tool pickups & grapples
 Knockout punches
 Conduit measurers
 Pipe pushers
 Mandrels
 Reamers,
 Threaders, stocks & dies
 Pipe pises, stands & holders
 Conduit racks

Allen Iron & Steel Co P O Box 550 Norristown Pa (11) Pa (11)
American Pipe Tool Co 4856 W Kinzie St Chicago 44 III (8-9-10)
Appleton Electric Co 1701-59 Wellington Ave Chimistrong Bros Tool Co 5200 W Armstrong Ave
Arrold Core End of Bross Fool Co Arrolet Corp Foot of Bower St Montgomery Pa Arrolet Corp Foot of County Co 82 South St Athol Machine & Foundry Co 82 South St Athol Mass (10)

Mass (10)

Beaver Pipe Tools Inc 310 Dana Ave NE Warren Ohio (2-9)

Ohio (2-9)

SEC CO 5325 W Rogers Milwaukee

Deaver Pipe Tools Inc 310 Dana Ave NE Warren Ohio (2-9)

BLACKHAWK MFG CO 5325 W Rogers Milwaukee 46 Wis (1-4)—ADV PG 123

BRIEGEL METHOD TOOL CO 104 N E First St Galva III (2-10)—ADV PG 106

C & B Engineering and Fabricating Corp P O Box 3701 Houston Tex (1-5)
Capewell Mfg Co 6-70 Governor St Hartford 2 Conn (10)

Collins Machinery Corp 5474 Alhambra Ave Los Angeles 32 Calif (2-9)
Cope (T J) Div Rome Cable Corp Collegeville 5 Pa (3)

Duro Fittings Co 2210 S Davis Ave 100 Duro Fittings Co 2210 S Davie Ave Los Angeles 22 Calif (1) ie Tool Works 12th & Liberty Sts Erie Pa (2-9-10) Gedney Electric Co Americas Bldg Radio City NY 20 NY (1) General Hardware Mfg Co Inc 80 White St NY 13

NY (8)
GREENLEE TOOL CO 2136 Twelfth St Rockford
III (1-4-6)—ADV PG 100-101
Henderson Electric Co Ampere Station East Orange
NJ (1) efeld Mfg Co 460 W Third St Winona Minn

(1)
Lew Electric Fittings Co 627 W Lake St Chicago 6 III (1)
LIDSEN OF NORTH CAROLINA INC 1000 First St Hayesville NC (1)—ADV PG 142
LINT (CLYDE W) 2323 W 18 St Chicago 8 III (4-10)—ADV PG 170
Madison Equipment Co 5405 Detroit Ave Cleveland 2 (b) (1) 2 Ohio (1)
Martin (H P) & Sons 801 W 12 St P 0 Box 475
Owensboro Ky (1-10)
Mayhew Steel Products Inc Sears St Extension
Shelburne Falls Mass (4)
Mercury Hydraulics Inc 1632 Wazee St Denver 2
Colo (6) Ohio (1) Colo (6)

Midwest Electric Mfg Co 1639 Walnut St Chicago 12 III (1)
National Electric Products Corp Gateway Center 140 Stamwix St Pittsburgh 22 Pa (1)
NYE 170L CO 4120-30 Fulleton Ave Chicago 32 III (9)—ADV PG 147
Oster Mfg Co 1340 E 289 St Wickliffe Ohlo (8-9-10)

Oviatt (D C) Co 2174 Lakeside Ave Cleveland 14 Ohio (2-8-9) Ohio (2-8-9)
Rattan Mfg Co 10 Wall St (P O Box 1745) New Haven 7 Conn (1)
Republic Steel Corp Steel And Tubes Div 224 E 131 St Cleveland 8 Ohio (1-7)
Richards (J R) Co P O Box 482 Carnegie Pa (1)

(1)
Ridge Tool Co 400 Clark St Elyria Ohio (2-8-9-10)
SILVEY PIPE BENDER CO 2215 Brighton Ave Kansas City 27 Mo (1)—ADV PG 168
Spring Load Mfg Corp 6332 Maynard Ave Seattle Wash (2)
Steel City Electric Co 1207 Columbus Ave Pittsburgh 39 Pa (1)
Steel Electric Products Co Inc 5602 18th Ave Brooklyn 4 NY (1)
STEELDUIT CO Republic Steel Bidg Youngstown Ohio (1)—ADV PG 143
Tal Bending Equipment Inc 417 N Water St Mil-

Tal Bending Equipment Inc 417 N Water St Mil-waukee 2 Wis (1) Templeton Kenly & Co Gardner Rd Broadview Thepitt Mfg Co Gregg & Hammond Sts Carnegie Pa (1) omas & Betts Co 36 Butler St Elizabeth 1 NJ (1)

N.J. (1)
Toledo Pipe Threading Machine Co 1445 Summit
St Toledo 4 Ohio (2-6-9-10)

VELOCITY POWER TOOL CO 201 N Braddock Ave
Pittsburgh 8 Pa (9)—ADV PG 157
Wachs (E H) Co 1525 N Dayton St Chicago 22 III (2) Wagner Malleable Products Co 222 W Adams St Chicago 6 III (2)

12D. MATERIALS HANDLING EQUIPMENT

Ladders
 Scaffolds & work towers
 Hoists
 Lift trucks

4. Lift trucks
5. Maintenance trucks
6. Hand trucks
7. Truck bodies & bins
8. Bins, cabinets, shelving & framing angle
9. Office & workshop trailers

Allen Iron & Steel Co P O Box 550 Norristown Pa (2-6-8) ra t2-6-97 Allied Mfg & Sales Co 3101 W Grand Ave Chicago 22 TH (1-2-3-4-5-6) Allis-Chalmers Mfg Co 930 S 70th St Milwaukee 1 Wis (4) American Engineering Co Wheatsheaf Lane & Sepviva St Philadelphia 37 Pa (3)

St. Philadelphia 37 Pa (37) American Pulley Co. 4200 Wissahickon Ave. Phila 29 Pa (4-5-6-9) Automatic Transportation Co. 101 W 87th St. Chi-cago 20 III (4-6) Baker-Roos Inc. 602 W McCarty St. Indianapolis 6 Ind (2)

Ballymore Co Lincoln & Garfield Aves West Chester Pa (1-2) Beaver-Advance Corp 12th & Factory Sts Ellwood City Pa (2)

Bernard-Franklin Co Inc Hedley & Balfour Sts Phila 37 Pa (6-8) Chester Hoist Div National Screw & Mfg Co Lis-bon Ohio (3)

Chicago Pneumatic Tool Co 6 E 44 St NY 17 NY (3)

NY (3) Chisholm-Moore Hoist Div Columbus McKinnon Chain Corp 6072 Fremont Ave Tonawanda NY (3) Coffine Hoist Div Duff-Norton Co Danville III (3) CraneVeyor Corp 1240 S Boyle Ave Los Angeles 23 CraneVeyor Corp 1240 S Boyle Ave Los Angeles 23
Calif (3)
Dayton Safety Ladder Co 2337 Gilbert Ave Cincinnati 6 Ohio (1)
Detroit Hoist & Machine Co 8292 Morrow St
Detroit 11 Mich (3)
Economy Engineering Co 4511 West Lake St
Chicago 24 III (1 thru 5)
Ederer Engineering Co 2943 1st Ave S Seattle 4
Wash (3)
Elicor Div F L Jacobs Co 4235 W North Ave Chicago 39 III (1-2-5)
Electro Lift Inc 204 Sargeant Ave Clifton NJ

cago 39 III (1-2-5) Electro Lift Inc 204 Sargeant Ave Clifton NJ (3)

(3)
Erickson Power Lift Trucks Inc St Anthony Blvd & University Ave NE Minneapolis 18 Minn (4)
Fairbanks Co 393 Lafayette St NY 3 NY (5)
Flex Angle Corp 3760 Natwood Ave (P 0 80x 418)
Youngstown 1 Ohio (8)
Frick-Galiagher Mra Co 110 S Michigan Ave Wellston Ohio (8)
Goshen Churn & Ladder Inc Goshen Ind (1-2)
Haertel (Walter) Co 2840 4th Ave So Minneapolis Minn (8)
Hamilton Caster & Mra Co 1519 Nivia Winneapolis

Minn (8)
Hamilton Caster & Mfa Co 1519 Dixie Highway
Hamilton Ohio (5-6-7-9)
Handy Angle Div Lug-All Co 355 Lancaster Ave
Haverford Pa (3)
Harnischfeger Corp 4400 W National Ave Milwaukee 46 Wis (3)
Hall Corp. 4100 W 150 St. Clawsland 13

kee 46 Wis (3)
Holan (J H) Corp 4100 W 150 St Cleveland 11
Ohio (1-7) Hyster Co 2902 N E Clackamas St Portland P Ore (4)

Ingersoll-Rand Co 11 Broadway NY 4 NY (3) Inland Ladder Co 1914 Stanford St Alameda Calif (1)

Calif (1)
International Trailer Co Inc 725 North Point Rd
Baltimore 6 Md (9)
King Mfg Corp 3146 N Chicago Ave Chicago 22
III (3)

Lantz Mfg Co Inc Valparaiso Ind (3) Leebaw Mfg Co 65 Wayne Ave Youngstown 2 Ohio (5-6)

LeTourneau (R G) Inc 2399 S MacArthur Longview Tex (3) Lift Trucks Inc 2425 Spring Grove Ave Cincinnati 14 Ohio (4-6) Manning Maxwell & Moore Inc 250 E Main St Stratford Conn (3)

Stratford Conn (3)
Massey-Ferguson Industrial Div Massey-Ferguson Inc
1009 S West St Wichita 13N Kans (4)
McCabe-Powers Body Co 5900 N Broadway St
Louis 15 Mo (1-3-5-7)
Mercury Mrg Co 4700 W Division St Chicago III
(4-6)

(4-6)
Moto-Truc Co 1953 E 59 St Cleveland 3 Ohio (4)
Nutting Truck and Caster Co 1201 W Division St
Faribault Minn (6)
O'Neil-Irwin Mfg Co 427 Eighth Ave Lake City
Minn (6) Patent Scaffolding Co Inc 38-21 12th St L I C 1 NY (1-2)

NY 1-21-21 Pucel Enterprises Inc 3746 Kelley Ave Cleveland 14 Ohio (6-8) Reading Crane & Hoist Corp 2100 Adams St Read-ing Pa (3) Revolvator Co 86th St & Tonnelle Ave Route 1 &

ing Pa (3)
evolvator Co 86th St & Tonnelle Ave Route 1 &
9 North Bergen NJ (4)
bblins & Myers Inc 1345 Lagonda Ave Springfield
Ohio (3) Onio (3) Rol-Away Truck Mfg Co Inc 6143 S E Foster Rd Portland 6 Ore (1-5-7-8) Rund (David) & Son Inc Box 883 Cleveland 22 Ohio (3)

Safway Steel Products Inc 6234 W State St Mil-Safway Steel Products Inc 6234 W State St Mil-waukec 13 Wis (2-3)
Sasgen Derrick Co 310.1 Grand Ave Chicago III (3)
Self-Lifting Piano Truck Co 42.3 N Main St Find-lay Ohio (3-6)
Shaw-Box Crane & Holst Div Manning Maxwell & Moore Inc Muskegon Mich (3)
Shure Mrg Corp 1601 S Hanley Rd St Louis Mo (8)

Silent Hoist & Crane Co 841-63rd St Brooklyn 20 NY (3-4)

NY (3-4)
South River Metal Products Co Inc. 377 Turnpike
South River NJ (1)
Stevens Appliance Truck Co
897) Augusta Ga (6)
Thor Power Tool Co 175 N State St. Aurora III

Up-Right Inc Up-Right Scaffolds Div 1013 Pardee St Berkeley 10 Calif (1-2) Utility Body Co 1530 Wood St Oakland 7 Calif (7)

Waco Mfg Co 3565 Wooddale Ave Minneapolis 16 Minn (2) Wellington Machine Co 133 De Wolf St Wellington Ohio (6)

Ohio (6)
Wilder Mfg Co Inc Mechanic St & Erie Railroad
Port Jervis NY (7)
Wright Hoist Div American Chain & Cable Co Inc
Franklin & Hay Sts York Pa (3)
Yale & Towne Mfg Co 11000 Roosevelt Blvd Phila
delphia 15 Pa (2-3-4-5-6)

Yeats Appliance Dolly Sales Co 2124 N 12th St Milwaukee 5 Wis (6)

12E. ARMATURE & STATOR TOOLS & EQUIP-

Air gap gauges
 Dynamic balancers
 Static balancers
 Holders & stands
 Banders
 Brush seaters
 Commutator grinding

Brush seaters
 Commutator grinding, cutting, scraping & filing equipment

Allen Electric and Euipment Co 2101-2117 N Pitcher St Kalamazoo Mich (7) Annis (R B) Co 1101 N Delaware St Indianapolis Ind (2)

Associated American Trading DIV Syrkus & Guttman Inc 750 St Ann's Ave New York 56 NY (5) Balance Engineering Co 5030 W Lake St Chicago 44 III (2-3) 44 III (2-3)
Co-operative Utilities Co Inc 4637-39 Mulberry St
Phila 24 Pa (6-7)
Pelta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III (4-5-7)
DeWalt Div American Machine & Foundry Co Lancaster Pa (7) caster Pa (7)
Dreier Brothers Inc 7301 Woodlawn Ave Chicago
19 III (7) Foredom Electric Co 27 Park Pl New York 7 NY General Electric Co Apparatus Sales Div Schenec-tady 5 NY (2) Gisholt Machine Co 1245 E Washington Ave Madi-son 10 Wis (2-3) Heller Tolo Co Heller Drive Newcomerstown Ohio Industries Inc 442 Elm St Sycamore III Hullhorst_Tools Inc 1915 Nebraska Ave Toledo 7 Ohio (7) Ideal Indus III (6-7) stries Inc 5136 Park Ave Sycamore Electric Co 1383 Hird Ave Cleveland 7 Unio (1-6-7) Milwaukee Electric Tool Corp 5368 W State St Milwaukee 8 Wis (7) Potter & Rayfield Inc P 0 Box 1042 Atlanta Ga (4-5) (4-5)

Raydyne Corp 2715 S Fourth St (P 0 Box 1147)
Springfield III (2-3)

Schauer Mfg Corp 4500 Alpine Ave Rossmoyne Ohio (7) Simonds Saw and Steel Co 470 Main St Fitchburg Mass (7) Sittler Corp 18 N Ada St Chicago 7 III (6-7) Snap-on-Tools Corp 8028 28th Ave Kenosha Wis (7) (7)
Superior Porcelain Co 931½ Market St Parkers-burg W Va (5)
Vibrascope Co P O Box 97 Glenford NY (2)
Waveland Electric Co 5542 N Ashland Ave Chicago 40 111 (6-7) 40 III (b-7)
Westinghouse Electric Corp P 0 Box 860 Pittsburgh 30 Pa (2)
Wyzenbeck & Staff Inc 223 N California Ave Chicago 12 III (7)
Yardney Electric Corp 40-50 Leonard St New York
13 NY (2-3)

12F. COIL TOOLS & EQUIPMENT

1. Cheeks
2. Heads
3. Impregnators
4. Lacing hooks
5. Spreaders
6. Tampers
7. Winders & tapers

Armature Coil Equipment Inc 2605 Vega Ave Cleveland 13 Ohio (5-7-8) Cleveland 13 Ohio (5-7-8)

Armstrong-Bray & Co 5366 Northwest Highway Chicago 30 III (4)

Associated American Trading Div Syrkus & Guttman Inc 750 St Ann's Ave New York 56 NY (7-8)

Chapman (P E) Electrical Works Inc 1820 Chouteau Ave St Louis 3 Mo (7)

Continental Electric Co 1234 S Prairie Ave (P O Box 895) Hawthorne Calif (2)

Crown Industrial Products Co 713 Amsterdam St Woodstock III (6-7)

Davis Electric Co 28 Parker St Walkingford Conn (7)

Delta-Star Electric Div H K Porter for Inc. 2437 Woodstock L. Communication of the Communication of Potter & Rayfield Inc P O Box 1042 Atlanta Ga (2-3-7-8) Stokes (F J) Corp 5500 Tabor Rd Philadelphia 20 Pa (3) ra .33 Superior Porcelain Co 931½ Market St Parkers-burg W Va (3) Universal Winding Co P 0 Box 1605 Providence 1 RI (7)

12G. INSULATION TOOLS

Cutters
 Edgers, folders, formers & turner Wedge drivers & removers

Billings & Spencer Co 1 Laurel St Hartford 1 Conn (1) Conn (1)
Crown Industrial Products Co 713 Amsterdam St
Woodstock III (2)
Pelta-Star Electric Div H K Porter Co Inc 2437
Fulton St Chicago 12 III (1)
Klein (Mathias) & Sons 7200 McCormick Rd Chicago 45 III (1)
Martindale Electric Co 1383 Hird Ave Cleveland
7 Ohio (1-2-3)
Szefet Jive Line Tool Co 973 86th Ave Oakland 21 Safety Live Line Tool Co 973 86th Ave Oakland 21 Calif (1)

12H. SOLDERING TOOLS & EQUIPMENT

Guns, irons & machines
 Stands
 Heaters

4. Pots 5. Torches

Acoustica Associates Inc 26 Windsor Ave Mineola NY (1) NY (1)
Alcar Instruments Inc. 17 Industrial Ave Little
Ferry NJ (1)
American Electrical Heater Co 6110 Cass Ave Detroit 2 Mich (1-2)
Bernz (Otto) Co Inc Driving Park & Ramona
Rochester 13 NY (5)
Chapman (P E) Electrical Works Inc. 1820 Chouteau
Ave St Louis 3 Mo (1)
Dockson Corp 3839 Wabash Ave Detroit 8 Mich
(5) (5) Considering Iron Co Inc. West Elm St. Deep River Conn (1-4)
Electric Materials Co. Box 390 North East Pa (1)
General Electric Co Apparatus Sales Div Schenectady 5 NY (1) General Eric tady 5 NY (1)
Hexacon Electric Co
Park NJ (1-2)
Ideal Industries Inc 5136 Park Ave Sycamore

Woodbridge St Detroit 7 Mich (1-3-5)
Kwikheat Mfg Co 3732 San Fernando Rd Glendale
4 Calif (1-2)
Lenk Mfg Co Franklin Ky (1-5)
Luma Electric Equipment Co 1607 Coining Drive
(P O Box 132) Toledo Ohio (1)
Lyon Rural Electric Co 2075 Moore St San
Diego 12 Calif (3) Mitchell Industries Inc Box 17 Municipal Airport
Mineral Wells Tex (1)
National Specialties Co Inc 1902 Howell St Ft
Wayne 7 Ind (1)
Newage Industries Inc 222 York Rd Jenkintown Newage I Pa (1) Prepo Corp Edgerton Wis (5)
Smith Welding Equipment Corp 2633 4th St S E
Minneapolis 14 Minn (1-2-3-5)
Snap-on-Tools Corp 8028 28th Ave Kenosha Wis
(1) (1) Sta-Warm Electric Co 53 N Chestnut St Ravenna Ohio (3-4) Triton Mfg Co Inc East Haddam Conn (1) Turner Brass Works 821 Park Ave Sycamore 111 (4-5)
Ungar Electric Tools Inc 4101 Redwood Ave Los
Angeles 66 Calif (1-3)
Velocity Power Tool Co 201 N Braddock Ave
Pittsburgh 8 Pa (5)
Vulcan Electric Co 88 Holten St Danvers Mass
(1-2-3-4) (4-5)Waage Electric Inc 720 Colfax Ave Kenilworth NJ (P) Mfg Co P O Box 71 Growe City Pa Wall (1-2-3-5)(1-2-3-5)
Weller Electric Corp 601 Stone's Crossing Rd Easton Pa (1)
Wen Products Inc 5808 Northwest Highway Chicago 31 III (1)
Wilder Mfg Co Inc Mechanic St & Erle Railroad Port Jervis NY (2)

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12J. SHOP TOOLS, MACHINES & EQUIP-MENT-MISC.

1. Arbor presses
2. Cable & outlet locators
3. Circle cutters & hole saws
4. Demagnetizers
5. Drilling & boring tools
6. Etchers & engravers
7. Even outlers Etchers & engravers
Fuse pullers
Gaar & bearing installers & extractors
Hand tools, electrician
Lump changers—incadescent
Lump disposal units
Magnetizers
Melting pots, tanks & kettles
Metal benders
Metal cutters & shears
Metal lutters
Metal lutters Metallizers Nameplates & decals
Oilers
Platers Portable electric tools Powder-actuated tools Sprayers
Static neutralizers & eliminators
Test leads & clips
Tool pouches & holders 27. Vacuum cleaners & noticers 28. Electric welders & accessories 29. Contact burnishers

Acme Electric Heating Co 1217 Washington St Boston 18 Mass (14) Acro Welder Mfg Co 1719 W St Paul Ave Mil-waukee 3 Wis (28) Acromark Co 320 Morrell St Elizabeth 4 NJ (6) Wis (29)
Wis (29)
Aircraft Specialties Inc 415 Howard St Lapeer
Mich (9) Albertson & Co Inc 3100 Lowell Sioux City 2 lows (5-21) Alcar Instruments Inc Ar Instruments Inc Ferry NJ (14)
American Floor Machine Co 518 S St Clair St Toledo 3 Ohio (27)
American Pipe Tool Co 4856 W Kinzie St Chicago 44 III (14)
Cago 44 III (14)
Rinn N Ridgeway Skokie III Alcar Instrun ents Inc 17 Industrial Ave Little merican Vacuum Co 8100 N Ridgeway Skokie III (27) (27)
Anderson (Albert & JM) Mfg Co 289 A St Boston 10 Mass (15)
Annis (R B) Co 1101 N Delaware St Indianapolis 2 Ind (4-6-13)
Arco Mfg Co 1701 13th Ave North (Box 817)
Grand Forks ND (21)
Armstrong-Bray & Co 5366 Northwest Highway Chicago 30 III (8)

ARRO EXPANSION BOLT CO P 0 Box 388 Marion Ohio (5)—ADV PG 160
Atlantic Engravers Inc 52 Ocean Ave Amityville NY (18)
Auto Arc-Weld Mfg Co 9615 Meech Ave Cleve-NY (18)
Auto Arc-Weld Mfg Co 9615 Meech Ave Cleveland 5 Ohio (28)
Benjamin Electric Mfg Co Northwest Highway &
Seegers Rd Des Plaines III (10)
Beverly Shear Mfg Co 3004 W 111 St Chicago
43 III (16) Billings & Spencer Co 1 Laurel St Hartford 1 Conn (9-16) Birdsell Mfg Co Inc 750 San Antonio Rd Palo Alto Calif (28) Black & Decker Mfg Co Towson 4 Md (14-16-21-27) Blackhawk Mfg Co 5325 W Rogers Milwaukee 46 ndieck Tool Co P O Box 499 Taylorville III

Bonney Forge & Tool Works 2400 Rockhill Rd (North) Alliance Ohio (9)
Borden Engineering Div M J Johnson Aircraft En-gineering Co Box 10 Morristown NJ (2)
Brady (W H) Co 727 W Glendale Ave Milwaukee 9 Breuer Electric Mfg Co 5100 N Ravenswood Ave Chicago 40 III (27) Chicago 40 III (27)
Bridgeport Hardware Mfg Corp Scofield Ave Bridgeport 5 Conn (9)
Burgess Vibrocafters Grayslake III (6-21)
Burndy Corp Norwalk Conn (9-22)
Caltron Products Co 3518 W Pico Blvd Los
Angeles 19 Calif (13)
Capewell Mfg Co 60-70 Governor St Hartford 2
Conn (3)
Chadsey Corp P O Box 1858 Hartford 1 Conn
(10-11-12)
CHAMPION DEARMENT TOOL CO South Mala St OCHAMPION DEARMENT TOOL CO South Main St Meadville Pa (9)—ADV PG 142-150 Chance (A B) Co 210 North Allen St Centralia Mo (7) MOD 1/7 Chicago Decalcomania Co 3310 Elston Ave Chicago 18 III (18) Chicago Pneumatic Tool Co 6 E 44 St NY 17 NY (21) (21)
Clements Mfg Co 6650 S Narragansett Ave Chicago 38 III (27)
Commercial Enclosed Fuse Co of NJ 6812 Polk St Guttenberg NJ (7)
Copper (D C) Co 1467 S Michigan Ave Chicago 5 III (14)
Copper (T J) Div Rome Cable Corp. Collegewills 5 Cope (T J) Div Rome Cable Corp Collegeville 5
Pa (14) Pa (14)
Coppus Engineering Corp 344 Park Ave Worcester
10 Mass (27)
Crane-Puller Co Waltham 54 Mass (8-9)
Crescent Tool Co 200 Harrison St Jamestown NY (9)

Crown Industrial Products Co 713 Amsterdam St Woodstock III (6)

Crozler Machine Tool Co 684 N Prairie Ave Hawthorne Calif (8)

Cummins Portable Tool Div John Oster Mfg Co 5055 N Lydell Ave Milwaukee 17 Wis (22)

Dake Corp 675 Robbins Rd Grand Haven Mich (1)

DeWilbiss Co 300 Phillips Ave Toledo 1 Ohio (23)

DeWalt Div American Machine & Foundry Co Fountain Ave Lancaster Pa (16-21)

Diamord Strand and Horseshoe Co 4702 Grand Ave Duluth 7 Minn (9)

Dickey-Grabier Co 10302 Madison Ave Cleveland 2 Ohio (6-18) (9) Ohio (6-18)

Doyle (J E) Co 1220 W 6th St Cleveland 13

Ohio (24) Vacuum Cleaner Co 234 Stevens St SW nd Rapids Mich (27) Doyle Doyle Vacuum Cleaner Co 234 Stevens St SW Grand Rapids Mich (27)
Dreier Brothers Inc 7301 Woodlawn Ave Chicago 19 III (9)
Duro Metal Products Co Kildare & Schubert Sts Chicago III (9)
Eagle Electric Mfq Co Inc 23-10 Bridge Plaza South Long Island City 1 NY (7)
Eastern Specialty Co 3617 N 8th St Phila 40 Pa (25) Eastern Sp Pa (25) Eisler Engl NJ (28) gineering Co Inc 750 S 13 St Newark 3 NJ (28)
Electric Arc Inc 152 Jelliff Ave Newark 8 NJ (28)
Electric Arc Sales Co P 0 Box 587 Ypsilanti
Mich (4-6-13-16)
Equipment Corp of America 1537 Superior Ave
Cleveland 14 Ohio (5)
Erie Tool Works 12th & Liberty Sts Erie Pa (9)
Erwood Inc 1770 Berteau Ave Chicago : III (3)
Ewald Instruments Box 124P Kent Conn (28)
Excel Fuse Co 117 W Erie St Ottsburgh 14 Fa
(7) Eynon-Dakin Co 9900 Freeland Ave Detroit 27 Eyono-Dakin Co Mich (19)

Mich (19)

Federal Machine & Welder Co 1745 Overland Ave NE Warren Ohio (28)
Fisher Research Laboratory Inc 1961 University Ave Palo Alto Calif (2)

Gaston Power Tools 999 Ridge Rd Thornton III Ave Palo Alto (
aston Power Tools
(21) (21)
General Electric Co Apparatus Sales Div Schenectady 5 NY (2-14-28)
General Hardware Mfg Co Inc 80 White St NY 13 NY (3-5-9)
General Scientific Equipment Co 7516 Limekiln Pike Philadelphia 50 Pa (26) oldak Co Inc 1544 W Glennaks Blvd Glendale 1 Goldak Co Inc 1544 W Glennaks Blvd Glendale 1 Calif (2) Graham Mfg Corp 152 Second Ave Needham Hts 94 Mass (28) ee Tool Co 2136 Twelfth St Rockford III Guyan Machinery Co Inc Box 150 Logan W Va (28)
Harnischfeger Corp 4400 W National Ave Milwaukee 46 Wis (28)
Hayden Twist Drill Co Manila Ark (5)
Heller Tool Co Heller Drive Newcomerstown Ohio
(9) Products Co 600 W Seventh St Reno Nev Holub Industries Inc 442 Elm St Sycamore III (7-27) ossfeld Mfg Co 460 W Third St Winona Minn (15) Hunter Tools 9851 Alburtis St Santa Fe Springs Calif (9-26)

Mich (149)
Interstate Drop Forge Co Special Products DIv 4051
N 27 St Milwaukee 16 Wis (9-16)
Invincible Vacuum Cleaner Mfg Co Dover Ohio (27)
Irwin Auger Bit Co 92 Grant St Wilmington Ohio (5-9)
Kearney (James R) Corp 4236 Clayton Ave St Louis 10 Mo (7)
Kent Co Inc 359 Canal St Rome NY (27)
Kett Tool Co 5055 Madison Rd Cincinnati 27
Ohio (5-9)
Klein (Leo) Electronics 2404 S LaBrea Ave Los Angeles 16 Calif (4-13)
Klein (Mathias) & Sons 7200 McCormick Rd Chicago 45 III (9-26)
Kraeuter & Co Inc 585 18th Ave Newark 3 NJ Kraeuter & Co Inc 585 18th Ave Newark 3 NJ (9)
Laduby Co Inc Boston Post Rd (P O Box 88)
Branford Conn (12)
Lee (K O) Co Congress at First Ave S E Aberdeen
S Dak (28)
Leetonia Tool Co 142 Main St Leetonia Ohio (9)
Lidseen (Gustave) Inc 1000 First St Hayesville
NC (19) Lincoln Electric Co 22801 St Clair Ave Cleveland Ohio (28) ■LIT Onlo (co) 2323 W 18 St Chicago 8 III (9)—ADV PG 170 Luma Electric Equipment Co 1607 Coining Drive (P 0 Box 132) Toledo Ohio (4-6) Mall Tool Co 25000 S Western Ave Park Forest 111 (21) III (21)
Martindale Electric Co 1383 Hird Ave Cleveland 7
Ohio (1.4-6-7-8-9-21-25-27)
Mayhew Steel Products Inc Sears St Extension
Shelburne Falls Mass (9) er Corp 1961 W 112 St Cleveland 2 Ohio McGill Mfg Co Inc Valparaiso Ind (10) Mephisto Tool Co Inc Box 16 Hudson NY (5-9) Meteor Mfg Corp 1441 Main St Buffalo 9 NY (9) (9)
Mico Instrument Co 80 Trowbridge St Cambridge 38 Mass (3-6)
Mid-States Welder Mfg Co 6025 S Ashland Ave Chicago 36 1II (28)
Miller Electric Mfg Co 718 S Bounds St Appleton Wis (28)
Miller Equipment Co Inc 13th & New Streets Franklin Pa (9-26) Miller Equipment Co Inc 13th & New Streets Franklin Pa (9-26)
Milwaukee Electric Tool Corp 5368 W State St Milwaukee B Wis (21)
MISENER MFG CO INC 202-208 Walton St Syracuse 2 NY (3)—ADV PG 166
Morrow Co 400 W Madison St Chicago 6 Ill (27)
Mueller Electric Co 1555G E 31 St Cleveland 14
Ohio (25)
Multi-Clean Products Inc 2277 Ford Parkway St Paul 16 Minn (27)
National Decalcompania Corp 236-38-40 N 60 St Paul 16 Minn (27)
National Decalcomania Corp 236-38-40 N 60 St
Phila 39 Pa (18)
National Electric Welding Machines Co 1846-1916
N Trumbull St Bay City Mich (28)
National Super Service Co 1946 N 13 St Toledo
Ohio (27) Ohio (27) Ohio (2/)
New England Carbide Tool Co Inc 55 Commercial
St Medford 55 Mass (5)
Newage Industries Inc 222 York Rd Jenkintown Newage 1 Pa (6) Pa (6)
North Shore Nameplate Inc 214-27 Northern Blvd
Bayside L. I. NY (18)
Omark Industries 9701 S E McLaughlin Blvd Portland 22 Ore (22)
O'Neil-Irwin Mfg Co 427 Eighth Ave Lake City
Minn (15-16) O'Nell-frwin Mfg Co 427 Eighth Ave Lake City Minn (15-16) Owatonna Tool Co 374 N Cedar St Owatonna Minn (1-8-9) Orwall Tool Co Ltd 928 Broadway New York 10 NY (9) Fullerton Ave & Westgate Rd Addison III (5) III (5)
Park Nameolate Co Inc 34-10 Linden Place Flushing NY (18)
Parr Mfg Corp 48 Hale St Cranford NJ (2)
Pattern Products Co P 0 Box 135 Union NJ (11)
Peck Stow & Wilcox Co 274 Center St Southington Conn (15-16)
Pedrick Tool & Machine Co 3640 N Lawrence St Phila 40 Pa (15) Phila 40 Pa (15) eer Inc 1220 Milton St Benton Harbor Mich Pennsylvania Drilling Co Masonry Drill Div 1201
Banksville Rd Pittsburgh 16 Pa (5)
Pines Engineering Co Inc 601 Walnut St Aurora III (15)
Plaster-Eye Co 2560 Noblestown Rd Pittsburgh 5
Pa (2) Porter-Cable Machine Co 700 Marcellus St Syracuse 4 NY (21) otter & Rayfield Inc P 0 Box 1042 Atlanta Go Precision Welder Mfg Co 2218 W Lake St Chicago 12 III (28) Rutzebeck P O Box 30 Hayward Calif Price & Rutzebeck P 0 Box 30 Mayward Calif (3-5-9-21-22) Producers and Distributors Inc 1321 Hanover Aev Allentown Pa (9-21) Pullman Vacuum Cleaner Corp 25 Buick St Boston 15 Mass (27)
Quality Tools Corp New Wilmington Pa (9)
RCS Tool Corp 227 E Front St (P 0 Box 661)
Bloomington III (21)
Radio Frequency Laboratories Inc Boonton New
Jersey (4-13)
Ramset Fastening System Winchester-Western Div
Olin Mathieson Chemical Corp 12117 Berea Rd
Cleveland 11 Ohlo (22) 15 Mass (27) Callf (9-26)

DIDEAL INDUSTRIES INC 5136 Park Ave Sycamore

III (4-6-7-27)—ADV PG 124

Industrial Devices Inc Edgewater 19 NJ (18-25)

Industrial Engravers Inc 2212 McDonald Ave

Brooklyn 23 NY (18-19) Ingersoll-Rand Co 11 Broadway NY 4 NY (21)

Insto-Gas Corp 998 E Woodbridge St Detroit 7 Mich (14)

PRAPID ELECTROPLATING PROCESS INC 1414 S
Wabash Ave Chicago 5 III (20)—ADV PG 173
Rawiplug Co Inc 212 Petersville Rd New Rochelle
NY (5-20) Ný (5-20)

River St Waitham 54 Mass (28)

Remington Arms Co Inc 939 Barnum Ave Bridgeport 2 Conn (22)

Rew Welder & Engineering Co 1200 Milton St Benton Harbor Milch (28)

Ridge Tool Co 400 Clark St Elyvia Ohio (5-9)

Robertson & Ruth 460 W Lake St Elmhurst III

Roberts (16) Rodale Mfg Co Inc 6th & Minor Sts Emmaus Pa (101 (26) Rogers Electric Laboratories Inc 2651 Shaker Rd Cleveland Hts 18 Ohlo (2) Rotary Concrete Drill Co 650 S Arroyo Parkway Pasadena 1 Calif (5) Sciaky Bross Inc 4915 W 67 St Chicago 38 III (28) Scientific Electric Inc 105-109 Monroe St Garfield N.J (28)

Seeger-Willi Conn (7) Iliams Inc 4 Norman St Bridgeport 5 Name Plate Co 431 W Rock Ave New Haven Conn (18) Shallcross Controls Inc 2217-21 N 31 St Mil-waukee 8 Wis (3-5-9-21) Walker Wis (3-3-9-21)
Shallcross Mfg Co Preston St Selma NC (2)
Shrader (F W) Co 11623 S Broadway Los Angeles
61 Calif (4-13)

Simpson E III (25) Electric Co 5200 W Kinzle St Chicago 44 Sittler Corp 18 N Ada St Chicago 7 III (25) Skil Corp 5033 Elston Ave Chicago 30 III (3-5-9-21) Slaughter Co College & Young Sts Piqua 5 Ohio (25)

Smith Wolding Equipment Corp 2633 4th St S E Minneapolis 14 Minn (28) Snap-on-Tools Corp 8028 28th Ave Kenosha Wis (1-3-5-8-9-16-17-21) Industries 1508 N Mascher St Phila 22 ra (18)
Spencer Turbine Co 486 New Park Ave Hartford
6 Conn (27) Sta-Warm Electric Co 53 N Chestnut St Ravenna Ohio (14)

Stanley Electric Tools 436 Myrtle St New Britain STAR EXPANSION Mountainville NY (5)—ADV PG 163
Starrett (L S) Co Athol Mass (3-9)

PG 163 Starrett (L. S) Co Athol Mass (3-9) Stricht (Herman H) Co Inc. 27 Park Place New York 7 NY (24) Stokes (F. J) Corp. 5500 Tabor Rd Philadelphia 20 uper Tool Co 21650 Hoover Rd Detroit 13 Mich (5) L) Iron Works 166 Glenwood Ave Medina Syntron Co 690 Lexington Ave Homer City Pa nfield Corp 1052 Mahoning Ave Warren Ohio (28) Tec Imports 14525 Bessemer St Van Nuys Calif (3-5-9) Termite Drills Inc 99 N Lotus Ave Pasadena 8 Calif (5)
Ther Corp 2115 S 54 Ave Chicago 50 III (21)
Ther Power Tool Co 175 N State St Aurora III (5-16-21) Tilden Tool Mfg Co 209 Los Molinos San Clemente Calif (5) Toledo Pipe Threading Machine Co 1445 Summit St Toledo 4 Ohio (9) ight Corp 160 E 9th Ave York Pennsylvania

1183 Mrg Co 2948 No 5th St Milwaukee 12 Wis (7-19) Trindl Products Ltd 1807-11 S Clark St Chicago 16 III (28) Truco Masonry Drilling Dlv Wheel Trueing Tool Co 3200-3220 W Davison Ave Detroit 38 Mich Brass Works 821 Park Ave Sycamore III United States Electrical Tool Co 3640 Llewellyn St Cincinnati Ohio (21)

St Cincinnati Ohio (21)
U S Expansion Bolt Co State St & P R R York
Pa (5)
United States Petroleum Co 104 Lakeview Ave
Clifton NJ (19)
Universal Electric Sales Corp 3537 Lee Rd Cleveland 20 Ohio (28)
Utica Drop Forge & Tool Div Kelsey-Hayes Co
Utica 4 NY (9)
Vaco Products Ca 317 F Ortaria St Chicago 31

oducts Co 317 E Ontario St Chicago 11 111 (9)

Velocity Power Tool Co 201 N Braddock Ave Pittsburgh 8 Pa (22) Vulcan Electric Co 88 Holten St Danvers Mass Vulcan (14) Waage Elec NJ (14) Electric Inc 720 Colfax Ave Kenilworth Wach (E H) Co 1525 N Dayton St Chicago 22

Wachs (E H) CO 1363 November 2011 (16)
Walco Electric Co 131 Blackstone St Providence 1 R1 (8)
Wall (P) Mfg Co P O Box 71 Grove City Pa

Wen Products

cts Inc 5808 Northwest Highway Chi-

Westline Products Div Western Lithograph Co 600 E Second St Los Angeles 54 Calif (18) Whitman & Barnes Div United Drill and Tool Corp 40600 Plymouth M Mich (5) Wilde Tool Co Inc Hiawatha Kans (9) Wilde Drop Forge and Tool Co 2936-40 Fairmount Kansas City 8 Mo (9)

Kansas City 8 Mo (400 Vulcan St Buffalo 7

NY (9)

WODACK ELECTRIC TOOL CORP 4627 W Huron St Chicago 44 III (5-21)—ADV PG 173

Wyzenbeek & Staff Inc 223 N California Ave Chicago 12 III (3-21)

Xcelite Inc Thorne Ave at Bank St Orchard Park

12K. FASTENING DEVICES

Bolt-sealing & screw-anchoring compound
 Expansion bolts, shields & anchors
 Concrete inserts
 Powder- & hammer-actuated tool fasteners

fasteners
5. Toggle boits

Ackerman-Johnson Co 625 W Jackson Blvd Chicago

Ackerman-Johnson Co 625 W Jackson Blvd Chicago 6 II (2-3-5)
American Sealants Co Hartford 6 Conn (1)
Apex Bolt Prodccts Co 452-458 No Claremont Ave Chicago 12 III (2-5)
ARRO EXPANSION BOLT CO P 0 Box 388 Marion Ohio (25)—ADV PG 160
Cope (T J) Div Rome Cable Corp College 5 Pa (3) Pa (3)
Diamond Expansion Bolt Co Inc Garwood NJ (2-5)
Equipment Corp of America 1537 Superior Ave
Cleveland 14 Ohio (2)
Fastway Fasteners Inc 1676 E 28 St Lorain

Ohio (4) Hilti Rapid Fastening NY 13 NY (24) ing Systems Inc 55 Van Dam St Holub Industries Inc 442 Elm St Sycamore III & Co 6301 Butler St Pittsburgh 1

Pa (2) Pa (2)
Industrial Devices Inc Edgewater 19 NJ (1)
Kirel Inc Box 459A RFD 1 Kingston NY (2)
Leibfried (C H) Mfg Corp 95-101 Guernsey St
Brooklyn 22 NY (3)
Mastercraft Plastics Co Inc 95-01 150th St
Jamaica 35 NY (2) St Berding Pa (2)

Mastercraft Plastics Co Inc 95-01 150th St Jamaica 35 NY (2) Molly Corp 230 N Fifth St Reading Mult-A-Frame Div Ainsworth Precision Castings Co 1471-77 E Atwater St Detroit 7 Mich (3) National Lead Co 111 Broadway NY 6 NY (2) New England Carbide Tool Co Inc 55 Commercial St Medford 55 Mass (1-2) Paine Co Fullerton Ave & Westgate Rd Addison III (2-5)

Co 2906-20 W 26 St Chicago 23 ilis Mfg 111 (2-5)

Ramset Fastening System Winchester-Western Div Olin Mathieson Chemical Ocop 12117 Berea Rd Cleveland 11 Ohio (4) Rawlplug Co Inc 212 Petersville Rd New Rochelle NY (2-5)

Remington Arms Co Inc 939 Barnum Ave Bridge-port 2 Conn (4) Security Insert Co 1300 Arch St Phila 7 Pa (3)

(3)
Southo Div South Chester Corp Lester Pa (2)
STAR EXPANSION Mountainville NY (2-3-5)—
ADV PG 163
STEEL CITY ELECTRIC CO 1207 Columbus Ave
Pittsburgh 33 Pa (3)—ADV PG 152
U S Expansion Bolt Co State St & P R R
York Pa (2-5)
Velocity Power Tool Co 201 N Braddock Ave
Pittsburgh 8 Pa (4)
Wahlund (M Paul) Mechanical Laboratory P 0
Box 16 Grant Iowa (3) Grant Iowa (3)

12M. MOTOR & GENERATOR REPLACEMENT PARTS

Armatures Bases Bearings & bushings

Brushes Brush holders

Capacitors, motor-starting
Commutators & commutator bars
Fields & windings
Flexible shafts

10. Frames 11. Shims 12. Terminal boxes 13. Slip rings

Ahlberg Bearing Co 3025 W 47 St Chicago 32 III (3) American Pulley Co 4200 Wissahickon Ave Phila 29 Pa (2) Amplex Div Chrysler Corp P 0 Box 2718 Detroit Mich (3) 31 31 Mich (3) Arco Mfg Co 1701 13th Ave North (Box 817) Grand Forks ND (2) Auburn Mfg Co Pease Ave & Stack St Middletown Conn (11) Conn (11)

Becker Bros Carbon Co 3450 So Laramle Ave
Cicero 50 III (4)

Mass (3)

Mass (3)

Round Parch (11) Bound Brook Oll-Less Bearing Co Bound Brook NJ (3) onze Bearings Inc 340 N Ave East Cranford NJ (3) Bunting Brass and Bronze Co 715 Spencer St To-ledo 1 Ohio (3) Carbon Engineering Corp P 0 Box 236 Slinger Wis (4) Carbone Corp 400 Myrtle Ave Boonton NJ (3-4) Chapin (Chas E) Co Inc 227 Fulton St New York 7 NY (4)
Chicago Commutator Inc Wheeling Rd & Exchange Ct. Wheeling III (7)
Chicago Die Casting Mfg Co - 2510-14 W Monroe Ct. Chicago 12 III (3)
Co-operative Utilities Co Inc 4637-39 Mulberry St. Phila 24 Pa (5)
Cornell-Dublier Electric Corp 333 Hamilton Blvd South Plainfield NJ (6)
Dayton Precision Mfg Co 213 N Beckel St Dayton 3 Ohio (7)
Electric Materials Co Box 390 North East Pa NY (4) Electric Materials Co Box 390 North East Pa Engelhard NJ (4) Ihard Industries Inc 113 Astor St Newark 5 Flower (D B) Mfg Co 1217 Spring Garden St Phila 23 Pa (5) General Electric Co Apparatus Sales Div Schenec-tady 5 NY (1-2-47-5-10-12) Girard-Hopkins 1000 40th Ave Oakland 1 Calif (6)

(6)
Green Ball Bearing Co 9518 Cassius Ave Cleveland 5 Ohio (3)
Gwilliam Co 360 Furman St. Brooklyn 1 NY (3)
HELWIG CO 2550 N 30 St. Milwaukee 10 Wisc
(4)—ADV PG 160
Hyatt Bearing Div General Motors Corp Harrison
NJ (3) ois Condenser Co 1616 N Throop St Chicago Engravers Inc 2212 McDonald Ave 23 NY (11)

Brooklyn 23

Johnson Bronze Co 490 S Mill St New Castle Pa Keystone Carbon Co Inc 1935 State St St Marys Pa (3-4) rkwood Carbon Corp 4857 W 130 Cleveland 11 Ohio (4) Ohio (4)

Kirkwood Commutator Corp 4855 W 130 St Cleveland 11

Kirkwood Commutator Corp 4855 W 130 St Cleveland 11

Ohio (7-13)

Lee (Waiter) Chemical Corp 1383 Seabury Ave

Bronx 61 NY (11)

Mall Tool Co 25000 S Western Ave Park Forest

III (9) Kirkwood Marlin-Roo NY (3) lockwell Corp 402 Chandler St Jamestown Martindale Electric Co 1383 Hird Ave Cleveland 7 Ohio (9) 7 Ohio (9)
Wurray Equipment Co Inc 14011 Oakland Ave
Detroit 3 Mich (2)
National Electric Coli Co 800 King Ave Columbus
16 Ohio (8)
Nice Ball Bearing Co 30th & Hunting Park Ave
Phila 40 Pa (3) Ohio Carbon Co 12508 Berea Rd Cleveland 11 Onio Carbon Co Inc 441 Hall Ave St Marys Pa (4) mid Electric Co 1445 Hudson Blvd North Pyramid Electric Co 1445 Hudson Blvd North Bergen NJ (6) Randall Graphite Bearings Inc Greenlawn & Lake Sts Lima Ohio (3)
Russell & Stoil Co Inc 125 Barclay St NY 7
NY (1) NY (1) SKF Industries Inc Front St & Erie Ave Phila 32 Pa (3) St Marys Carbon Co State St St Marys Pa (3-4)

(3-4)'
Seager Standard Carbon Co 291 Chruch St New York 13 NY (4)'
Shenango Furnace Co Centrifugally Cast Products Div West Third St Dover Onio (3-13)'
Southern Carbon Brush Co Inc #7-18th St SW (P O Box 1710) Birmingham 8 ATa (4)'
Southern Electrical Equipment Co 308 W Bland at Mint St Charlotte 3 NC (13)'
Sprague Electric Co North Adams Mass (6)
Stackpole Carbon Co Stackpole St St Marys Pa (4) (4)
Stow Mfg Co 162 Shear St Binghamton NY (9)
Superior Carbon Products Co 9115 George Ave
Cleveland 5 Ohio (4-13)
Swiss Jewel Co 225 Lafayette Bldg Phila 6 Pa Toledo Commutator Co 1101 S Chestnut St Owosso Mich (7-13) United States Graphite Co 1621 Holland Ave Saginaw Mich (3-4) Waveland Electric Co 5542 N Achiand Cago 40 111 /4 Saginaw Mich (3-49) Waveland Electric Co 5542 N Ashland Ave Chl-cago 40 III (4-5) Set 10 Box 868 Pitts-burgh 30 Pa (1-3-4-5-7-8) O Box 868 Pitts-burgh 30 Pa (1-3-4-5-7-8) New Castle Dela

Wrought Washer Mfg Co 2280 S Bay St Mil-waukee 7 Wis (3-11)

12N. PERSONNEL PROTECTIVE EQUIPMENT

 Clothing
 Eyeshields & goggles
 Face shields & masks 3. Face shield: 4. Respirators

Linemen's protective clothing & equipment is listed under "Linemen's Tools & Accessories" in Section 12.

Charleston Rubber Co Stark Industrial Park Charleston SC (1)
DeVilbiss Co 300 Phillips Ave Toledo 1 Ohio (4)
Dockson Corp 3839 Wabash Ave Detroit 8 Mich

(18)

General Electric Co Apparatus Sales Div Schenectady 5 NY (2-3)
General Scientific Equipment Co 7516 Limekiln Pike
Philadelphia 50 Pa (1-2-3-4)
Kedman Co 233 S Fifth West St Salt Lake City
Utah (3)
Lincoln Electric Co 22801 St Clair Ave Cleveland
17 Ohio (2-3-4)
Martindale Electric Co 1383 Hird Ave Cleveland
7 Ohio (2-3-4)
Mine Safety Appliances Co 201 N Braddock Ave
Pittsburgh 8 Pa (2-3-4)

Schauer Mfg Corp 4500 Alpine Ave Rossmoyne Ohio (2)
Smith Welding Equipment Corp 2633 4th St S E Minneapolis 14 Minn (2)
Snyder (M L) & Son Inc 1897 E York St Phila 25 Pa (1)
Standard Portable Cord Co Inc Mayville NY (2)
Waveland Electric Co 5542 N Ashland Ave Chicago 40 III (2-3-4)

12P. EXPENDABLE SUPPLIES, MISC.

1. Armsture banding
2. Banding & lacing twine
3. Beeswax
4. Cleaning compound
5. Commutator cement
6. Flux & paste
7. Impregnating compound
8. Rust & corrosion preventives
9. Slot wedges & sticks
10. Solder
11. Wire-stripping and pulling compounds
12. Wire & cable tags & markers
13. Controller contacts Insulation and tape are listed individually under 12Q, R, S, T and U in this section.

All-State Welding Alloys Co Inc 249-55 Ferris Ave
White Plains NY (6-10)

ALLEN (L B) CO INC 5624 N Newark at Bryn
Mawr Chicago 31 III (6-10)—ADV PG 140
Allen-Bradley Co 136 W Greenfield Ave Milwaukee
4 Wis (13)

Allen-Bradley Co 136 W Greenfield Ave Milwaukee 4 WIs (13)
Alpha Metals Inc P O Box 34 Bergen Station 56
Water St Jersey City 4 NJ (6-10)
American Products Mfg Co Inc 8127-33 Oleander St New Orleans 18 La (7)
American Silver Co Inc Industrial Div 36-07
Prince St Flushing 54 NY (6)
American Solder & Flux Co 19th & Willard Sts
Phila 40 Pa (6-8)
Anaconda Wire & Cable Co 25 Broadway New York 4 NY (12)
Anchor Metal Co Inc 966 Meeker Ave Brooklyn 22
NY (6-10)
Arsco Mfg & Sales Corp 451 Tenth Ave New York 18 NY (7-8)
Benson (Alexander R) Co Inc 2 Davis Rd New Hartford NY (6-10)
Berry (William B) Co 117 Causeway St Boston 14
Mass (12)
Bios Laboratories Inc 17 W 60 St New York 23
NY (34-7.8.A.-1.8.C.)

Mass (12) Bios Laboratories Inc 17 W 60 St New York 23 NY (3-4-6-7-8-9-10)

NY (3-4-6-7-8-9-10)
Brady (W H) Co 727 W Glendale Ave Milwaukee
9 Wis (12)
Brand (William) & Co Inc 51 North St Willimantic Conn (12)
Burnley Battery & Mfg Corp 103 Clay St (P 0 Box 511) North East Pa (6)
Carboline Co 32 Hanley Industrial Ct St Louis 17 Mo (8)
Carbolineum Wood Preserving Co 6683 N 40 St Milwaukee Wis (8)
Chapin (Chas E) Co Inc 227 Fulton St New York 7 NY (13)
Chemalioy Electronics Corp Gillespie Field Santee

Chemalloy Electronics Corp Gillespie Field Santee Calif (10)

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Calif (10)
Crown Industrial Products Co 713 Amsterdam St
Woodstock III (8)
Delta Chemical Works Inc 23 W 60 St New
York 23 NY (3-4-6-7-8-10)
Division Lead Co 7742 W 61 PI Summit III

York 23 N1 C4-07-78

Division Lead Co 7742 W 61 Pl Summit III
(6-7-9)

Dunton (M W) Co 7 Goff St Providence RI (6-10)

Eagle Electric Mfg Co Inc 23-10 Bridge Plaza

South Long Island City 1 NY (6)

Early (Edward E) Co 1129 5th St N W Canton 3

Ohio (5)

Carriy (coward t) Co 1129 5th St N W Canton 3 Ohio (5)

ELECTRIC COMPOUND CO 4145 W 150 St (P O Box 2772) Cleveland 11 Ohio (11)—ADV PG 154

Englehard Industries Inc 113 Astor St Newark 5 NJ (6-10)

Farrelloy Co 1245 N 26th St Phila 21 Pa (6-8-10)

10)

10)
Federated Metals Div American Smelting & Refining Co 120 Broadway New York 5 NY (6-10)
Fidelity Chemical Products Corp 470 Frelinghuysen Ave Newark 5 NJ (4-8-11)
General Electric Co Chemical & Metallurgical Div Silicone Products Dept Waterford NY (7)
Glastic Corp 4321 Glenridge Rd Cleveland 21
Ghio (9)
Hardman (H V) Co Inc 571 Cortlandt St Belleville 9 NJ (7)
IDFA I INDICTORES INC 5136 Park Ave Syranges

william NJ (7)

**IDEAL INDUSTRIES INC 5136 Park Ave Sycamore
III (5-11)—ADV PG 124
Insulation Mfrs Corp 555 W Washington Blvd
Chicago 6 III (2-9)

Johns-Manville 22 E 40 St New York 16 NY (8)
Johnson Mfg Co Inc 600 Anamosa Rd Mt Vernon
Iowa (6-10)
Johnston Foll Mfg Co 6106 S Broadway St
Louis 12 Mo (20)
Jordan Co 51st & Merrimac Ave Chicago 38 III
(6) (8)

(6)
Kester Solder Co 4201 Wrightwood Ave Chicago
39 Illinois (6-10)
Keyes-Davis Co 74-14th St Battle Creek Mich Keyes-D (12)

Keyes-Davis Co 74-14th St Battle Creek Mich (12)
London Chemical Co Inc 1535 N 31 Ave Melrose Park III (6-11)
Ludiow Mfg & Sales Co P O Box 101 Needham Heights 94 Mass (2)
Lukens (Thos F) Metal Co Philadelphia 37 Pa (6-10)
Martindale Electric Co 1383 Hird Ave Cleveland 7 Ohio (5)
McGill Mfg Co Inc Valparaiso Ind (6)
Metal & Thermit Corp Rahway NJ (8)
Mico Instrument Co 80 Trowbridge St Cambridge 38 Mass (6-10)
Midland Paint & Varnish Co 3801 E 91st St Cleveland 5 Ohio (8)
MINERALLAC ELECTRIC CO 25 N Perola St Chicago 7 III (11)—ADV PG 136
Mona Industries Inc Paterson 17 NJ (4-8)
Monal Monustries Co 99 Grove St Rockland Mass (13)
National Band & Tag Co 721 York St Newport

Band & Tag Co 721 York St Newport

NATIONAL CALL COLL CO. SOO King Ave Columbus
16 Ohio (1-2-3-5-6-7-9-10)
NATIONAL LEAD CO. 111 Broadway NY 6 NY
(6-10) (6-10)
North Shore Nameplate Inc 214-27 Northern Blvd
Bayside L I NY (12)
Northwoods Mfg Chemists Inc Porterfield Wis (4)
Ohio Carbon Co 12508 Berea Rd Cleveland 11
Ohio (13)

Onio Carboni C

(8)
Seton Name Plate Co 431 W Rock Ave New
Haven 15 Conn (12)
Sherwin-Williams Co 101 Prospect Ave N W
Cleveland 1 Ohio (7)
Silicone Insulation Inc 1383 Seabury Ave Bronx Creveland 1 Unio V/ Silicone Insulation Inc 1383 Seabury Ave Bronx 61 NY (9) Sittler Corp 18 N Ada St Chicago 7 III (5) Smith Welding Eqiupment Corp 2633 4th St S E Minneapolis 14 Minn (6)

Stackpole Carbon Co Stackpole St St Marys Pa

Minincapolis 14 Minin (20 Stackpole St St Marys Pa (13) Subox Inc Fairmont Plant Hackensack NJ (8) Sulfo Inc 1143 E Jersey St Elizabeth 4 NJ (6) Sulfo Inc 1143 E Jersey St Elizabeth 4 NJ (6) Sulfo Inc 1143 E Jersey St Elizabeth 4 NJ (6) Turco Products Inc 6135 S Central Ave Los Angeles 1 Calif (4-8) Waveland Electric Co 5542 N Ashland Ave Chicago 40 III (5-13) Westinghouse Electric Corp P O Box 868 Pitts-burgh 30 Pa (13) Westinghouse Electric Corp P O Box 868 Pitts-burgh 30 Pa (13) Westinghouse Electric Corp P O Box 868 Pitts-burgh 30 Pa (13) Westinghouse Electric Corp P O Box 868 Pitts-burgh 30 Pa (13) Westinghouse Electric Corp P O Box 868 Pitts-burgh 30 Pa (13) Westinghouse Electric Corp P O Box 868 Pitts-burgh 30 Pa (13) Sulfondo S Poston Mass (8) Williams Co. 130 Lincoln St Brighton 35 Boston Mass (8)

nington Fibre Specialty Co New Castle Dela

12Q. SHEETS, RODS & TUBES

- 1. Asbestos
 2. Cambric
 3. Fiber, glass fiber & fiberboard
 4. Paper composition
 5. Mica
 6. Polyester film
 7. Pressboard (Fullerboard)
 8. Plastic
 9. Silicone
 10. Varnished silk

Anchor Packing Co 401 N Broad St Philadelphia 8 Pa (1) Auburn Mfg Co Pease Ave & Stack St Middletown Conn (1 thru 7) os Laboratories Inc 17 W 60 St New York 23 NY (5-6-8-9) Brand Dielectrics 57 North St Willimantic Conn (1-2-3-4) Chase & Sons Inc 26 Spruce St North Quincy Mass (6-8-9)

Mass (6-6-9)
Connecticut Hard Rubber Co 407 East St New
Haven 9 Conn (9)
Contrental-Diamond Fibre Newark Del (1-3-4)
COTTRELL PAPER CO INC 88 Purchase St Fall
River Mass (4)—ADV PG 152
Electro-Technical Products Div Sun Chemical Corp
113 E Centre St Nutley 10 NJ (1-2-3-4-6-

Emerson Plastics Corp 1383 Seabury Ave Bronx 61 NY (3-4-5-7-8-9) General Electric Co Chemical & Metallurgical DN Laminated Products Dept Coshocton Ohio (1-2-3-4-9)

3-4-9)
General Electric Co Chemical & Metallurgical Div Silicone Products Dept Waterford NY (9)
General Electric Co Insulating Materials Sec Chemical Materials Dept 24 River Rd Schenectady 5 NY (2-4)
Glastic Corp 4921 Glenridge Rd Cleveland 21 Ohio (8)
Goodrich (8 F) Chemical Co 3135 Euclid Ave Cleveland 15 Ohio (8)
Illumitronic Engineering 680 E Taylor Ave Sunnyvale Calif (8)

Vale Call t GP
Insulation Mfrs Corp 565 W Washington Blvd Chicago 6 III (4)

JOHNS-MANVILLE 22 E 40 St New York 16
NY (1-3)—ADV PG 171.
Keasbey & Mattison Co Butler Ave Ambier Pa Kendall Co Polyken Sales Div 309 W Jackson Bivd Chicago 6 III (8) Lee (Walter) Chemical Corp 1383 Seabury Ave Bronx 61 NY (8) Mica Fabricating Co 53 Central Ave Rochelle Park

MI (4-5)
Minnesota Mining & Mfg Co Irvington Div 6
Argyle Terrace Irvington 11 NJ (1-2-3-4-5-6-8-9-10) Mitchell Rand Insulation Co 51 Murray St NY 7 NY (1-2-4) Mycalex Corp of America 125 Clifton Blvd Clifton NJ (5)

NJ (5)
National Electric Coil Co 800 King Ave Columbus
16 Ohio (1 thru 10)
Natvor Corp 211 Randolph Ave Woodbridge NJ
(2-4-8-10) St Regis Paper Co 261 Madison Ave
New York 16 NY (8)
Penn Fibre & Specialty Co Inc 2024 E Westmoreland St Phila 34 Pa (3-4-7-6)
Permacel-LePages Inc U S Highway #1 New
Brunswick NJ (1-4)
Polyken Sales Div Kendali Co 309 W Jackson
Blvd Chicago 6 III (8)
Polymer Corp 2120 Fairmount Ave Reading Pa
(8) Polymer Corp 2120 Fairmount Ave Reading Pa (8)

Raybestos-Manhattan Inc 61 Willett St Passalc NJ (1)

Red Seal Electric Co 10307 Detroit Ave Cleveland 2 Ohio (3-8)

Ruberoid Co 500 Fifth Ave New York 36 NY (1)

Silicone Insulation Inc 1383 Seabury Ave Bronx 61 NY (3-8-9)

Spaulding Fibre Co Inc 310 Wheeler St Tonawanda NY (3-4-7-8)

Stone Paper Tube Co 900 Franklin St N E Washington 17 DC (4)

Sylvania Electric Prooucts Inc 1740 Broadway NY 19 NY (5)

Taylor Fibre Co Norristown Pa (3-8-9)

Union Carbide Corp Silicone Div 30 E 42 St New York 17 NY (9)

Westinghouse Electric Corp P 0 Box 868 Pitts-burgh 30 Pa (1-3-4-6)

Wilmington Fibre Specialty Co New Castle Dela (3-4-8)

12R. TAPE-PRESSURE-SENSITIVE (ADHESIVE)

- 1. Cellophane
 2. Electrical
 3. Friction
 4. Masking
 5. Rubber
 6. Varnished cambric

ACCURATE MFG CO 44 Hepworth Place Garfield NJ (2-3-5-7)—ADV PG 147
Anchor Packing Co 401 N Broad St Philadelphia B Pa (2-3)
Appleton Rubber Co Inc 57 Cornwall St Boston 30 Mass (3-5-7)
Bishop Mfg Corp 10 Canfield Rd Cedar Grove NJ (2-5-7)

BOSTON WOVEN HOSE & RUBBER CO P 0 Bor 1071 Boston 3 Mass (2-3-5-7)—ADV PG 108 Brand Dielectrics 57 North St Willimantic Conn (2)

Brand Dielectrics 57 North St Willimantic Conn (2)

Bright Star Industries 600 Getty Ave Clifton NJ (2-3-5-7)

Chase & Sons Inc 26 Spruce St North Quincy Mass (1-2-3-5-7)

Clifton Mfg Co Inc Mattapan Boston 26 Mass (2-3-5-7)

Connecticut Hard Rubber Co 407 East St New Haven 9 Conn (2-7)

Continental-Diamond Firbe Newark Del (2-7)

Continental-Diamond Firbe Newark Del (2-7)

Dunton Whober Co Depton 1 Ohio (2-3-5-7)

Dunton (M W) Co 7 Goff St Providence RI (2-3)

Dutch Brand Div Johns-Manville 7-800 S Woodlawn Ave Chicago 19 III (1-2-3-4-5-7)

Electro-Technical Products Div Sun Chemical Corp 113 E Centre St Nutley 10 NJ (1-6-7)

General Electric Co Insulating Materials Sec Chemical Materials Dept 24 River Rd Schenectady 5 NY (6-7)

Goddall Rubber Co 493 Whitehead Rd Trenton NJ (3-5-7)

GRAYBAR ELECTRIC CO 1NC 420 Lexington Ave NN 73 NY (2-3-3-3 NV 0-2-3-3 NV 0-2-3 NV 0-2

GRAYBAR ELECTRIC CO INC 420 Lexington Ave NY 17 NY (2-3-4-5)—ADV PG 2-177 Haartz-Mason Inc 270 Pleasant St Watertown 72 Mass (2-3-5-7)

Insulation Mfrs Corp 565 W Washington Blvd Chicago 6 III (3) Jenkins Bros Rubber Div 100 Park Ave New York 17 NV (3-5-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7) (3-50-7)

Labelon Tape Co Inc 450 Atlantic Ave Rochester NY (12-7)
Lee (Walter) Chemical Corp 1383 Seabury Ave
Bronx 61 NY (7)
Mica Fabricating Co 53 Central Ave Rochelle
Park NJ (2)

Minnesota Mining and Mfg Co
Div 900 Bush Ave St Paul 6
Minnesota Mining & Mfg Co
Argyle Terrace Irvington 11
Mitchell Rand Insulation Co
Minray St NY Minn (1-2-4-5-7) NY (1-2-3-4-5-6-7)

Mystik Adhesive Products Inc 2635 N Kildare Ave Chicago 39 III (1-2-4-5-7) National Electric Coil Co 800 King Ave Columbus 16 Ohio (1 thru 7)

16 Ohio (1 thru 7)
Permacel-LePages Inc. U S Highway #1 New
New Brunswick NJ (1-2-4-7)
Peters Mfg Co 162 Old Colony Ave Wollaston 70
Mass (2-5)

Mass (2-5)

PLYMOUTH RUBBER CO INC 23 Revere St Canton Mass (1-2-34-5-7)—ADV PG 139

Polyken Sales Div Kendall Co 309 W Jackson Blvd Chicago 6 III (4-7)

Polymer Corp 2120 Fairmount Ave Reading Pa (2-7)

Rayb s-Manhattan Inc 61 Willett St Passaic NJ (5-7)

NJ (5-7)
Ruberoid Co 500 Fifth Ave New York 36 NY (3)
Superior Insulating Tape Co 3100 Lambdin Ave
St Louis 15 Mo (3-5-7)
Topflight Corp 160 E 9th Ave York Pa (1-2)
United States Rubber Co Mechanical Goods Div
1230 Avenue of the Americas New York 20 NY
(2-3-4-5-6-7) Westinghouse Electric Corp P 0 Box 868 Pitts-burgh 30 Pa (6)

T25. TAPE-WOVEN & OTHER

Asbestos Celíulose acetate Cotton Crepe paper Polyester Polyethelene Glass fiber

Anchor Packing Co 401 N Broad St Philadelphia Auburn Mig Co Pease Ave & Stack St Middle-town Conn (1-6-8) Bishop Mig Corp 10 Canfield Rd Cedar Grove NJ (6) Pa (1)

Brand Dielectrics 57 North St Willimantic Conn (7-8) Chase & Sons Inc 26 Spruce St North Quincy Mass (1-2-3-6-7-8) Clifton Mfg Co Inc 34 Topalian St Mattapan Boston 26 Mass (7-8) 34 Topalian St Mattapan

Boston 26 Mass (7-8)
Connecticut Hard Rubber Co 407 East St New
Haven 9 Conn (8)
Continental-Diamond Firbe Newark Del (1-5-7-8)
Dutch Brand Div Johns-Manville 7800 S Woodlawn Ave Chicago 19 111 (2-3-4-5-7)
Electro-Technical Products Div Sun Chemical Corp
113 E Centre St Nutley 10 NJ (1-5-8)
General Electric Co Insulating Material Sec
Chemical Materials Dept 24 River Rd Schenectady 5 NY (6-8)
Insulation Mirs Corp 565 W Washington Blvd
Chicago 6 III (1-3)
JOHNS-MANVILLE 22 E 40 St New York 16
NY (1)—ADV PG 171
Keasbey & Mattison Co Butler Ave Ambler Pa
11)

innesota Mining & Mfg Co Irvington Div 6
Argyle Terrace Irvington 11 NJ (1-2-3-4-5-6-7-8) 841 Mitchell Rand Insulation Co 51 Murray St NY 7

NY (1-2-3-4)
National Electric Coil Co 800 King Ave Columbus
16 Ohio (1 thru 8) Natvar Corp 211 Randolph Ave Woodbridge NJ

(6-7-8) Permacel-LePages Inc U S Highway #1 New Brunswick NJ (2-3-4-5-6-7-8) Peters Mfg Co 162 Old Colony Ave Wollaston 70 Mass (4-5-6-7-8)

Plymouth Rubber Co Inc 23 Revere St Canton Mass (6)
Polyken Sales Div Kendall Co 309 W Jackson Blvd Chicago 6 III (5-6-7-8)
Raybestos-Manhattan Inc 61 Willett St Passaic

States Rubber Co Mechanical Goods Div Avenue of the Americas New York 20 United United States Rubber Co Mechanical Goods Div 1230 Avenue of the Americas New York 20 NY (1-4) Varflex Corp 508 W Court St Rome NY (5-6-7) Westinghouse Electric Corp P 0 Box 868 Pitts-burgh 30 Pa (1-3-7-8)

12T. FLEXIBLE SLEEVING & TUBING

1. Cotton
1. Silicone
3. Plastic
4. Rubber
5. Fiber

Automatic Vuicanizers Corp 16 Hudson St New York 13 NY (4)
Brand (William) & CO Inc 51 North St Willimantic Conn (1-2-3)
Connecticut Hard Rubber Co 407 East St New Haven 9 Conn (1-4)
Continental-Diamond Fibre Newark Del (2-3-5)
Condail Enther Co 43 Whitehead Rd Tenton

Goodall Rubber Co 493 Whitehead Rd NJ (3-4) Hewitt-Robins Inc 666 Glenbrook Rd Stamford Conn (1-4) Hitemp Wires Inc 1200 Shames Dr Westbury NY (3)

itronic Engineering 680 E Taylor Ave Sunny-e Calif (3) vale Calif (3)
Insulation Mfrs Corp 565 W Washington Blvd
Chicago 6 III (1-2)
Lee (Walter) Chemical Corp 1383 Seabury Ave

se (Walter) Chemical Corp 1383 Seabury Ave Bronx 61 NY (3) linnesota Mining & Mfg Co Irvington Div 6 Argyle Terace Irvington 11 NJ (1-2-3-4-5) litchell Rand Insulation Co 51 Murray St NY 7 NY (1-2-5)

National Electric Coil Co 800 King Ave Columbus 16 Ohio (1 thru 5)
Natvar Corp 211 Randolph Ave Woodbridge NJ Natvar Co (1-2-3)

Penn Fibre & Specialty Co Inc 2024 E Westmore-iand St Phila 34 Pa (3-4-5) Permacel-LePages Inc U S Highway #1 New Brunswick NJ (3) Polymer Corp 2120 Fairmont Ave Reading Pa

(3) (3)
Saylor Electric Products Corp 277 Pierce St Birm-ingham Mich (1-3-5)
Snyder (M L) & Son Inc 1897 E York St Phila 25 Pa (3-4)

25 Pa (3-4) Stone Paper Tube Co 900 Franklin St N E Washington 17 DC (3-5) Suflex Corp 33-40 57th St Woodside 77 NY (1-2-3-4-5) United States Rubber Co Mechanical Goods Div 1230 Avenue of the Americas New York 20 NY (3-4)

Varflex Corp 508 W Court St Rome NY (1 thru 5)

Westline Products Div Western Lithograph Co 600 E Second St Los Angeles 54 Calif (3) Wilmington Fibre Specialty Co New Castle Dela

12U. INSULATING MATERIALS— MISCELLANEOUS

Beads
Cable wrapping
Cement
Fused quartz
Insulating compounds
Varnished canvas (duck cloth)
Insulating paint

Porcelgin

10. Switchboard mats 11. Varnish

All-State Welding Alloys Co Inc 249-55 Ferris Ave White Plains NY (5)
American Products Mfg Co Inc 8127-33 Oleander St New Orleans 18 La (5)
Aries Laboratories Inc 45-33 Davis St Long Island City 1 NY (5)
Automatic Vulcanizers Corp 16 Hudson St New York 13 NY (5) York 13 NY (5) arrett Varnish Co 1532 S 50th Ct Cicero 50 III

Bios Laboratories Inc 17 W 60 St New York 23 NY (3-5-7-11)

NY (3-5-7-11)
Blackburn (Jasper) Corp 1525 Woodson Rd St
Louis 14 Mo (5)
BBORTHIG (GEORGE C) CO INC P 0 Box 115
Rutherford NJ (3-5-7-11)—ADV PG 156
Brand Dielectrics 57 North St Willimantic Conn (2-6)Central Scientific Co 1700 Irving Pk Rd Chicago 13 III (3)

Central Scientific Co 1700 Irring F No. 13 III (3)
Connecticut Hard Rubber Co 407 East St New Haven 9 Conn (3)
Cook's Sons (Adam) Inc 5 N Stiles St Linden NJ

(5)
Delta Chemical Works Inc 23 W 60 St New York
23 NY (3-5-7-11)
Dolph (John C) Co Monmouth Junction NJ (5-11)
Dow Corning Corp Midland Mich (5-11)
Eagle-Picher Co American Building Cincinnatl 1

Dow Corning Corp Midland Mich (5-11)
Eagle-Picher Co American Building Cincinnatl 1
Ohio (3-5)
Electro-Technical Products Div Sun Chemical Corp
113 E Centre St Nutley 10 NJ (6)
Elliott Electric Products Co 1513 Olmstead Ave
New York 62 NY (5)
Englehard Industries Inc 113 Astor St Newark 5
NJ (4)
Faron Mfg Co Inc 845 Main St Poughkeensie NY

Fargo Mfg Co Inc 845 Main St Poughkeepsie NY (5) G & W Electric Specialty Co 3500 W 127 St Blue Island III (5) General Electric Co Insulating Material Sec Chemical Materials Dept 24 River Rd Schenec-tady 5, NY (3-5-6-7-11)

Chemical Materials Dept 24 River Rd Schenectady 5 NY (3-5-6-7-11)
General Electric Co Chemical & Metallurgical Div Silicone Products Dept Waterford NY (5-11)
Goodrich (8 F) Chemical Co 3135 Euclid Ave Cleveland 15 Ohio (5)
Hardman (H V) Co Inc 571 Cortlandt St Belleville 9 NJ (5)
Hubbard & Co 6301 Butler St Pittsburgh 1 Pa (8)

I-T-E Circuit Breaker Co 19th & Hamilton Sts Phila 30 Pa (8)
Ilnois Edison Porcelain McGraw-Edison Co 510
N Pearl St Macomb III (8) Sunnyvale Calif

N Pearl St Macomb III (8)
Illumitronic Engineering 680 East Taylor Ave
Sunnyale Calif (2)
JOHNS-MANVILLE 22 E 40 St New York 16
NY (3-5)—ADV PG 171
Joy Mfg Co Electrical Products Div 1201 Macklind Ave St Louis 10 Mo (5)
Lapp Insulator Co Inc 35 Gilbert St Leroy
NY (8)
NY (8) NY (8)

Lastik Products Co Inc 201 Iroquois Bldg Pittsburgh 13 Pa (11)

Lint (Clyde W) 2323 W 16 St Chicago 8 III (5)

Martindale Electric Co 1383 Hird Ave Cleveland 7 Ohio (1-3-11)

Midland Paint & Varnish Co 3801 E 91st St Cleveland 5 Ohio (7-11)

Mineraliac Electric Co 25 N Peoria St Chicago 7 III (5)

Mineraliac Electric Co 25 N Peoria St Chicago 7 Mineraliac Electric Co 25 N Peoria St Chicago 7 Mineraliac Electric Co 25 N Peoria St Chicago 7 Mineraliac Electric Co 25 N Peoria St Chicago 7 Mineraliac Mineraliac Co 25 N Peoria St Chicago 7 Mineraliac Mineraliac Co 25 N Peoria St Chicago 7 Mineraliac Chicago

III (5)
Minnesota Minning and Mfg Co Electrical Products
Div 900 Bush Ave St Paul 6 Minn (5)
Minnesota Minning & Mfg Co Irvington Div 6
Argyle Terrace Irvington 11 NJ (2-3-5-6-7-11)
Mitchell Rand Insulation Co 51 Murray St NY 7 NY (5-6-7-11)
National Electric Coil Co 800 King Ave Columbus
16 Ohio (6)
Natyar Corp 211 Randolph Ave Woodbridge NJ (6)

(6)
New Jersey Porcelain Co Inc Plum St & N Y Ave
(P O Box 908) Trenton 5 NJ (8)
PLM Products Inc 3871 W 150 St Cleveland 11 unia (J) Perinacel-LePages Inc U S Highway #1 New Brunswick NJ (5-11) Peters Mfg Co 162 Old Colony Ave Wollaston 70 Mass (S) Plymouth Rubber Co Inc 23 Revere St Canton Mass (5) Portland-Monson Slate Co 465 Congress St Port-

land 3 Me (9)

Pyrosil Inc 1889 Front St Cuyahoga Falls Ohio
(4) Quigley Co Inc 415 Madison Ave New York 17 NY (3-7) -Manhattan Inc 61 Willett St Passaic

Robot Appliances Inc 7041 Orchard St Dearborn Mich (10) Ruberoid Co 500 Fifth Ave New York 36 NY (3) Rusgreen Mfg Co 14262 Birwood Ave Detroit 38 Mich (5) 500 Fifth Ave New York 36 NY (3)

Mich (5)
Sauereisen Cements Co 1045 N Canal St Pitts-burgh 15 Pa (3-5-7)
Saxonburg Ceramics P O Box 100 Saxonburg burgh 15 Pa (3-5-7)
Saxonburg Ceramics P O Box 100 Saxonburg
Pa (1-8)
Schenectady Varnish Co Inc Congress & 9th Sts
Schenectady 1 NY (5-11)
Sherwin-Williams Co 101 Prospect Ave N W Cleveland 1 Ohio (5-7-11)
Star Porcelain Co Muirhead Ave Trenton 9 NJ
(1-8)
Thermal American Fund

Thermal American Fused Quartz Co 18 Salem St Dover NJ (4)

Dover NJ (4)
Union Carbide Corp Silicones Div 30 E 42 St
New York 17 NY (2-5-11)
Wilbur & Williams Co 130 Lincoin St Brighton
35 Boston Mass (7)
Zippertubing Co 752 S San Pedro Los Angeles 14
Calif (2)

12V. PRICING & ESTIMATING SERVICE

Complete pricing and estimating serivce for all types of electrical equipment.

Biddle Trade Publishing Co 2720 Beverly Blvd Los Angeles 57 Calif Henderson-Hazel Corp 13601 Euclid Ave Cleveland 12 Ohio Trade Service Publications Inc 341 E Ohio St Chicago 11 III.

TECHNICAL LITERATURE

To obtain the following literature, enter the appropriate Code Numbers* on the Free Information cards elsewhere in this issue.

Description, Pages Catalog No. & Mfr. Code No.

12-1 Safety Products: 34p: Cat. No. 58 (Miller)

12-2 Carbon Brushes; 100p (Kirkwood Carbon)

12-3 Commutators; 28p; Cat. No. 3A (Kirkwood Commutator)

П			
	12-4	Anchoring & Drilling Devices; 32p; Cat. No. 69 (Arro)	12-1
	12-5	Motor Repair Shop Equipment; 12p; Cat. No. 501A (Crown)	12-2
	12-6	Steel Shop Equipment; 40p; Cat. No. 1057 (Pucel)	12-2
	12-7	Hoisting Equipment; 24p; Cat. No. 87 (Round)	12-2
	12-8	Fractional Horsepower Brushes; 86p; Cat. No. 50 (Chapin)	12-2
	12-9	Brazing Manual; 24p; Cat. No. 12456 (All- State)	12-2
	12-10	Fractional Horsepower Motor Brushes; 91p (Carbon)	12-2
	12-11	Industrial Brushes for Motors & Generators; 16p (Carbon)	12-2
	12-12	Tool Brushes; 43p (Carbon)	12-2
	12-13	Masonry Drilling Equipment; 27p (Pennsylvania Drilling)	12-2
	12-14	Metal Signs & Letters; 80p; Cat. No. 45 (Spencer)	12-2
	12-15	Fasteners for Masonry & Hollow Walls; 36p; Cat. No. 156A (Diamond)	
	12-16	Cable Vulcanizers; 16p; Cat. No. B-48a (Joy)	dre
	12-17	Timesaving Tools for Electricians; 12p; Cat. No. 35E (Greenlee)	ren
	12-18	Pole Line Construction Tools; 24p; Cat. No. 50 (Dicke)	tifi ple

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12-19	Portable Balancing Equipment; 8p; Cat. No. 12-V (Vibrascope)
12-20	Static & Dynamic Balancing Handbook; 16p (Gisholt)
12-21	Electric Motor Bearings; 64p; Cat. No. EM (Johnson Bronze)
12-22	Applications of Insulating Varnishes; 10p (Dolph)
12-23	Masonry Anchors; 40p; Cat. No. 234 (Rawl- plug)
12-24	Coil Winding Machines & Spreaders; 20p (Armature)
12-25	Maintenance Equipment; 64p; Cat. No. 31 (Martindale)
12-26	Pipe Tools; 20p; Cat. No. 7596-R6 (Ridge)
12-27	Bearing Engineering Data; 164p; Cat. No. 350 (SKF)
12-28	Pipe Pushing Manual; 26p; (Mercury)
12-29	Electrical Insulating Materials; 12p; Cat. No. GER-1467 (G-E)

rite directly to the indicated adess for the following, enclosing mittance. To insure correct idenication of publication desired, ease specify "as listed in the

Electrical Products Guide" when ordering. Prices are subject to change.

American Welding Society, 33 W. 39th St., New York 18, N. Y.: Recommended Practices for Spot Welding Aluminum and Aluminum Alloys, 31p. Price: \$2.00 Recommended Practices for Resistance Welding, 58p. Price: \$1.00 American Standard: Safety In Welding and Cutting, 49p. Price: \$2.00 Standard Welding Symbols, 67p. Price: \$2.00

American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.: ASTM Standards on Electrical Insulating Materials, 678p. Price: \$6.00

National Academy of Sciences, National Research Coun-cil, Washington, D. C.: Digest of Literature on Dielectrics, 239p. Price: \$5.00 Annual Report of the Conference on Electrical Insu-lation, 70p. Price: \$3.00

All-State Welding Alloys Co. Inc., 249-55 Ferris Ave., White Plains, N. Y.: Instruction Manual, Alloys & Fluxes, 52p. Price: 10¢

Electrical Construction and Maintenance, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Specifications, 1958, 78 pages. Price \$1.50

Electrical Wholesaling, Dept. 270-059A, 330 W. 42nd St., N. Y. 36, N. Y.: Electrical Equipment Manual, 176p. Price: \$4.00

ELECTRICAL CONSTRUCTION AND MAINTENANCE

January through June, 1958

THE following index covers the editorial contents of the 6 issues of Electrical Construction and Maintenance published from January through June, 1958. It is arranged in six sections. Items are listed alphabetically in each section, showing the month of issue and page number.

The first section, beginning on this page, is a general alphabetical listing of subjects not specifically covered by the four functional classifications, which include Circuit

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Where an item or article is concerned with more than one main subject, it is indexed under each.

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This section of the EPG contains a coordinated presentation of symbols, formulas and reference information commonly employed in the design, installation and maintenance of electrical systems. WIRING, LIGHTING, HEATING, and SOUND are the principal

subjects covered.

To locate specific data, turn to the TECHNICAL DATA INDEX on page 5. Under the proper subject heading, included data is described and the page numbers are designated.

Company and Trade Name Directory

Manufacturers of equipment normally used by subscribers of *Electrical Construction & Maintenance* are listed in this section with their latest addresses.

Companies that have changed their names or have been combined with other firms are listed under the old names as cross-references to the new titles. Divisions and subsidiaries are listed under their own name except where the division is named for the products it produces (Fan Dept., Conduit Division, etc.). In such cases, listings are under the name of the parent firm.

Trade names are included in the same alphabetical listing as company names. Trade names are listed in capital letters.

Product Selection Data

This section of the EPG consists of specific information presented by manufacturers to aid the reader in selecting the right product for his project. The range of data includes dimensions, ratings, applications, performance and design features; district sales representatives are listed in many cases. In general,

presentations have been designed to give the reader all information necessary to determine the availability and suitability of any given item.

EPG welcomes suggestions from readers as to the types of data they would like to see included in the Product Selection Data section of this guide.

Product Directory

Manufacturers of equipment and materials normally used in electrical construction, plant operations and motor service work are listed under 12 major sections, numbered 1 to 12. Each of these is further broken down to individual classes of equipment, lettered A, B, C, etc.

To find a specific product, first locate the product in the comprehensive alphabetical index beginning on page 180. (Use handy edge index on front cover to locate this index.) For example, the index shows

"Cartridge Fuses" to be listed under 4B. Again using the edge index, turn to Section 4 and find "Cartridge Fuses" as number 1 under the heading "4B. FUSES". Companies listed under FUSES which are followed by the bracketed number (1) manufacture cartridge fuses.

Listings in heavy (bold-face) type are followed by references to the pages on which the listed manufacturer offers detailed information about the particular product.

Technical Literature

Manuals, bulletins and other reference material on electrical products are listed following each of the twelve product classifications of the Product Directory. Those listed as being available without

cost may be obtained by filling in the requested information on one of the Free Information cards on page 213. Write directly to the addresses listed for those references for which there is a charge.

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